The Builder.

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*Sculpture, Criticism, and Record.**

WE owe to German writers the best works on Greek art. The enthusiasm with which the German mind throws itself into special branches of pursuit is extraordinary. The advantage to be derived from the principle of subdivision of labour, or of specialisation of pursuit, is nowhere more distinctly manifest than in the monographs and detailed studies that we owe to the literature of Germany. Thus we may find men to whom all that possesses any genuine or overmastering interest, as a matter of contemplation, is contained in the brief period of a century and a half, or at the utmost two centuries, of which the era of Pericles forms the central portion; and while the literature of this time is familiar to them, even to the position of an accent, it is only as illustrative of one art,—of the great Attic school of sculpture,—that they care even for classical literature.

It is thus that we have attained an insight into much of the inner spirit of the art of Greece at which we might otherwise yet have been far from arriving. At the same time, we have to deal with a difficulty, and to suggest a caution. Greek can be translated into German with far greater ease, elegance, and precision than into English, but the result is still a translation. So the most elaborate view of Grecian art to which we can refer is yet a German view. It is not purely Greek. It may, we do not deny, take a loftier standpoint; but it is not the classic standpoint. German art-writers see things in ancient art which,—we do not say are not there in truth, but which—were not intended or comprehended by Greek artists. Again, they do not see things which those artists did see,—or, rather, feel.

For here lies the secret of the difference. The Greek was a sensuous artist; the German is an intellectual critic. While the first had a vision or an inspiration of beauty, which he clothed, he hardly knew how, in a material raiment of marble or of bronze, the latter seeks to analyse the method by which the former instinctively wrought. Not only so, but he is only too liable to suggest some predominant influence as ruling over the studio, of which the sculptor had no notion whatever. Thus the latest German writer who has had his very beautiful essays on sculpture translated into the English language, imports his own political opinions into Greece, and sees them reflected from the marbles of the Parthenon. It was the spirit of freedom, he thinks, that produced the excellence of Greek sculpture. This is a thoroughly Northern idea. Those who are most familiar with the population and the habits of Southern Europe best know its extreme divergence from fact. That the finest period of sculpture coincided with a time when Greek society was in a state of seething transition is no doubt true. But from the petty and mischievous disputes of the former, the artist held ever apart. Thriving most, in all periods, under the beneficent protection of some great prince, whether he were called Pericles or Alexander, Cosmo or Leo, art has for the most part shrunk and withered when politics have absorbed the public mind. In Greece we know that there were artists who lived in extreme poverty, while devoting their whole soul to some noble triumph of their art; just as there were philosophers, who descended to servile toil in order to gain that daily bread which would support a life mainly devoted to speculative thought. Thus Herr Lübke enters the temple of Greek art somewhat by climbing over the wall, instead of approaching by the proper avenue.

The history of sculpture, indeed, is a subject too vast and grand,—we will not say to be attempted, *inter alia*, by one man,—but certainly to be comprised, in any but a very imperfect manner, within the limits of two such volumes as these, which do much credit to the enterprise of Messrs. Smith, Elder, & Co.

Thus the introduction, and the account of Indian, Egyptian, and Assyrian sculpture, are all contained within fifty-seven pages. Not only is a space so limited entirely disproportioned to the geographical province reviewed, but it is so small as to preclude that species of technical investigation which ought properly to precede any philosophical attempt to appreciate Greek sculpture. The direct influence of the long-established traditions of Egyptian art is, we think, undervalued. The great Nilotic people had one strong characteristic in common with the younger Semitic tribes,—that is to say, horror of change. Permanence was an attribute of the divine nature. Innovation, therefore, was sinful, and a cause of misery. With the Aryan people, on the contrary, novelty has always been the chief charm. It is thus that we find the periods of highest excellence in Greek sculpture to have been so brief and ephemeral. The greatest pupil of the greatest master was not content to follow that master's footsteps. Even from Phidias to Polycletus there is a wide step. But while acknowledging a mental constitution which caused art to spring up like a flower, to blossom into the utmost glory, rapidly to transform itself, to wither, and to decay; we must still bear in mind the long ages through which the elder people, from whom the sacred fire was really caught, toiled with unshrinking diligence. And even in the very severity of Egyptian sculpture are to be traced the phenomena of growth, of over-growth, and of decay, although they have occupied milenniums instead of decades. Herr Lübke does not recognise the great decline that took place under, and down to, the Ptolemies, or appreciate the wonderful grandeur with which the works of the great eighteenth dynasty illustrate the golden period of Egyptian art. The subject had better have been altogether omitted, than treated of in a chapter in which the author evidently thinks each word a mere waste of time, until he arrives at the shores of Greece.

We wish to exhaust our objections to a work at which it is impossible to look without admiration, or to peruse without sympathy and delight. The real motive of the book is Greek art. To this, however, only 272 pages, out of the whole work are devoted. The result is, that justice is hardly done to any part of the subject. This is more especially to be noted in the crowded sequences of individual names. A man need to be thoroughly familiar with the whole encyclopædia of artists at all to follow the writer in many places. The indication of a name may often be quite enough for a student; but for an ordinary reader, it is a mere hieroglyphic. When we add to this, that references are almost entirely absent, except to one or two books which are themselves of an encyclopædic nature, it will be seen that a great deal has to be done before a history of sculpture, worthy of the title, is forthcoming.

In some places we are left in doubt whether it is the author or the translator who is altogether at sea. Thus we are told that "Glaucus, of Chios, is said to have devised the art of soldering iron, about the beginning of the seventh century." As no such art is known to the metallurgy of the present day, we are left in some doubt as to what is meant. "The ancients," continues the author, "justly attached great importance to this advance in technical skill, which at once undoubtedly was applied to the working in bronze." It is evident that the translator here is not to be alone blamed. We concluded at first that the word "solder" had been used in technical unacquaintance with the subject, instead of the word "weld." But as this is inapplicable to bronze, it is difficult to read the riddle. Hammered work, cast work, and the peculiar qualities of iron and of the alloys of copper, are regulated by principles so different, that it is impossible for an author to write intelligently as to sculpture in metal without some elementary knowledge of the procedures of the forge and the foundry.

It is unsafe to allow a popular and easy translation of a work on a technical subject to leave the press without the proof-sheets having passed under the eye of a classical scholar,—we might, indeed, add, of a master of English composition. The passages are numerous in which we are left in doubt, as we have said, whether it is the author or the translator who is to blame. Some points seem to depend exclusively on the latter. Such are the irregular modes of spelling adopted. Some words, Greek, indeed, in their source, but familiar to English literature as introduced through a Latin medium, and as spelt in all English classics in the Latin form, are made to assume a quasi-Greek dress. Such are Peiræus and Peirithous. At times we are introduced to an old acquaintance in such a form as to be almost utterly unrecognisable, as in the instance of Gæ Curotrophus. On the other hand, the Greek name of the Goddess of Victory is hardly to be recognised when we read of the Temple of Nice. Both this word and others, such, for instance, as the architectural term "metope," are used indifferently in the singular and the plural. Sometimes the meaning which the words convey must be the opposite to that which the writer had in view. Thus, when we read, "This more vigorous position corresponds better with a champion goddess, as the people styled her, than the calm bearing of a Promachus," it seems that the writer is unaware of the fact that a Promachus *is* a champion. One of the most unpardonable of these blunders is to be found in p. 160 of vol. i., which speaks of "the parting of Orpheus from Eurydice after he has seduced her into the lower regions." It is with fear and trembling that we proceed in a work in which we stumble upon revelations like these.

Apart, however, from the account which the author has to regulate with the translator, we take definite issue with Dr. Lübke upon some important points of artistic criticism. We select those on which we are able to speak, not as a mere matter of difference of opinion, but as guided by those exact laws of Grecian sculpture which an English writer has recently wrought out into complete and demonstrated system. We may, indeed, take exception to such expressions as "Bronze, however, is less adapted to ideal figures." No evidence is offered in support of an assertion which such artists as Benvenuto Cellini would certainly have directly contradicted, and for which no reason is adduced. But we entirely disagree with the notice given of one of the most perfect and admirable bronze

* History of Sculpture, from the Earliest Ages to the Present Time. By Dr. Wilhelm Lübke. Smith, Elder, & Co. 1872.

figures in the world, the "Wearied Mercury" of the Museum of Naples. This figure is highly naturalistic in its treatment, while the closely-cropped curling hair, and the deformity, common now to the races of the Magna-Grecian blood, of large up-pricked ears, date it as post-Alexandrine. But the main character of the statue,—its absolute motive,—is the breathless, panting exhaustion, which is evident, not in the face alone, but in the *pose* of the entire figure, and in the perfectly consistent relaxation of the entire muscular fabric. The photograph of this beautiful figure, which is to be obtained at the Museo Borbonico, is a very inferior production. But the woodcut in the "History of Sculpture" fails to give the slightest idea of the subject. The expressions, "the head is slightly bent forward, with an intelligent expression of countenance," and "it presents a fresh picture of elastic youth, resigning itself to a moment's easy repose after preceding effort," show that the critic has altogether missed the motive of one of the most wonderful pieces of pathognomic expression within the range of antique art.

Again, under the head of the Attic School, and within the period "from the freedom of Athens to the death of Alexander," we find a criticism on the marble now in the Louvre, known by the inappropriate name of Apollo Sauroctonus. It is merely the figure of a boy about to transfix a lizard running on a tree. If the name of any member of the Pantheon is to be ascribed to the slight youthful figure, it is that of Cupid, not of Apollo, of whom it presents neither lineament nor attribute. The confusion of the ordinary lizard of Southern Europe with the python connected with the oracular Sun-god, is not new; but it should not be repeated by any critical writer. But, what is of more importance is, that the actual proportions of the figure, when reduced to a tabular form, betray its late date, and are perceptibly faulty; the length from the forehead to the nipple of the breast being much in excess of that proper to the pure Greek scale. Nor is this a disproportion that is likely to have crept in by the slovenly copying of an originally symmetric figure.

In speaking of Praxiteles, the Correggio of sculpture, in connexion with a work that shows the influence of Lysippus on a declining art, the critic attributes to that sculptor the magnificent Cupid at the British Museum, to which we have, on a previous occasion, called attention, with reference to the faulty restoration of the left foot. From the spot where it was found, from the marble, and from the style of the work, there is every reason to attribute this exquisite relic to Phidias. The very low relief in which the belt, or rather ribbon, that suspended the quiver is indicated across the bust of the figure, is enough to show that it is not from the chisel of Praxiteles. Mention is made of, although scant justice is done to, the Cupid of Centocelle, now in the Vatican, which is one of the most beautiful relics of the purest Greek art in existence. There is a cast of this Cupid at the Crystal Palace, and an even more perfect representation of it is furnished by the beautiful photograph of the Berlin Photographic Company. As clearly as any artistic fact can be proved, in the absence of a direct pedigree, this figure is a copy of the famous Cupid of Praxiteles, which that sculptor prized above all his other works. It is worthy of such an estimation. There exists in the Museum of Naples the broken figure of a Psyche, parts of which have been sawn off (no doubt after the fracture of the statue in consequence of being thrown from its pedestal by an earthquake), which is a fit companion for this Cupid. It speaks highly for the taste which has presided over the collection of sculpture at the Crystal Palace, that the casts of these two precious relics are thus brought together in the court.

It is evident, however, that a very popular, a very instructive, and a very charming book may be written on sculpture by an author who is not in the very foremost rank of criticism. And such is, no doubt, the case. The illustrations are not of the first merit, but they are passably good. Altogether the work is one calculated to become a great popular favourite, and to turn the attention of the reading public towards that noble art for the full development of which our climate is not the most favourable. We can hardly blame Herr Lübke for his unacquaintance with English sculpture (or with sculpture in England, which is not altogether the same matter), owing to the fact that no works exist on which he might have based his acquaintance with the subject. And yet to write a history of sculpture in which the name of Flaxman is almost the only one which belongs to English art, is something like writing a history of Europe in which the existence of the United Provinces is ignored. Among "modern sculptors, from Bernini to Canova," it is strange to find no mention of the artist of whom Flaxman was the pupil and the godson; whose "Newton" was considered by Canova the finest work in the country,—a man whose brief career influenced his successors so powerfully as that of Roubiliac. Again, Bacon has left a name not to be omitted; and Westmacott should not be passed over. In short, there is a chapter of art of no mean significance which is entirely ignored by the German critic. For this there can be no excuse. But it remains an opprobrium to the art-literature of this country that no competent work exists which catalogues, to say nothing of critically appreciating, our historic monumental sculpture. Not only in our two metropolitan *campi santi* of the abbey and of the cathedral, in the well-known precincts of the Temple, and in many a time-honoured site that is not ecclesiastical, exist some monuments of artistic merit, and others of great historic value; but throughout the country, scattered wide if not thick, are to be found portrait statues, the faithful delineation of which would illustrate at once the history of sculpture and the history of England. The bronze monuments of Westminster Abbey alone afford materials for a most instructive chapter. The mortuary chapel of the Dukes of Bedford, at Chenies, Bucks, contains beautiful effigies of the Tudor times, as well as relics of crusading date. In the church of Great Bedwyn, Wilts, is a statue of Sir John Seymour, the grandfather of Edward VI., which is remarkable, not only for its heraldic enrichment, but for depicting a phase in the series of modifications by which mail passed into plate-armour, which is of great interest and value. We might pass from county to county (even as we did a year or two back with reference to the stained glass of early date) and constantly light upon monuments of greater or less importance. It is extremely desirable that an index of all effigies now existing in the churches and cathedrals of England should be compiled. With every year that elapses, the task will become more difficult properly to execute. For with every year the work of church repair and restoration is extended. And in how many instances a cruel and ignorant neglect, or a still more cruel and ignorant attempt to smarten up and restore ancient monumental effigies, is obliterating invaluable records of the past. The index completed, the work of the illustrator should commence. This is one of the subjects which is admirably adapted for photographic representation. Photographs of marble sculpture are more truthful and more beautiful than those of any other objects. Even the distortion which occurs is, to a certain extent, within the reach of calculation to avoid, or, at least, to estimate. A work of this kind would be truly national. It is to be regretted that the attempt made by the Society of Antiquaries to commence such a task has not called forth a more worthy response. But the scope and range of that effort were not sufficiently wide. The work should be exhaustively undertaken. There are, of course, monuments of a high character, and others of very low merit. But we ought to have a list of all. It is never certain how much light may be thrown on any branch of study by a single fact, however simple, when once arranged in its proper place. A headless, cross-legged effigy, in an obscure village churchyard, may furnish to the historian or to the genealogist the very clue of which he is in search. It ill becomes a nation which calls itself civilised to be without one national and reliable account of either its public monuments or its historic effigies.

We shall do good service to those of our readers who feel an interest in Greek art if we take this opportunity of mentioning a subject which, though not directly applicable to sculpture, yet is illustrative of the art. One single specimen of what may be called easel-painting among the antique masters is known to exist. It is called the Muse of Cortona, and is preserved in that city. What we have to mention with reference to it is, that a very good engraving of it is to be found in the Italian periodical called *L'Arte in Italia*, for the year 1870, a work which publishes many beautiful illustrations. Physiognomically speaking, the pointed form of the upper lip is not correct for a Muse. But the face is one of rare beauty. The treatment is thoroughly sculptural, and our appreciation of the range of Greek art is enhanced by the study of the engraving.

SANITARY SCIENCE AND STATISTICS IN IRELAND.

If with the advance of sanitary opinion and knowledge corporate and public action kept pace, Ireland in general, and its capital in particular, might be congratulated on some progression. Within the last two years, and notably within the last twelve months, the sanitary question has been receiving more than the customary attention accorded to it in the sister kingdom. Throughout the provinces, in several places where local matters are attended to, or supposed to be attended to, by the town commissioners, there appears to be yet a lamentable amount of ignorance on the part of officials as to their precise duties, and an indifference as to whether this necessary knowledge is acquired or not. Between sanitary inspectors of Local Boards on the one hand, and relieving officers of Poor-law unions on the other, matters are either continually clashing, or remain in a state of neglect. When neither town commissioners nor Poor-law guardians will take the trouble of informing themselves of their duties, we need not wonder at the curious decisions given betimes by the magistrates at petty sessions, the said magistrates curiously enough being often both guardians and town commissioners. Despite the existing muddle, we are glad to bear evidence to the growing desire to manage things better in various quarters of the island. No country has suffered more terribly for the criminal neglect of its corporate and local bodies than has Ireland within the last five-and-twenty years. Epidemics have visited Ireland with as startling a constancy and accuracy as eclipses. They have been almost periodic every ten years during the present century, and the probability exists that Ireland will soon feel the effect of another visitation, which, though it may not be possible to entirely prevent, yet it might be robbed of its severity by timely precautions. In matters of this kind we would rather that events would prove us to be false prophets than otherwise, for we have no desire to witness a spectacle that all honest hearts must mourn, though they at the same time must censure the administration that rendered such spectacle almost inevitable.

In the month of May last some professional men and other citizens met together in Dublin to consider what steps should be taken to improve its deplorable sanitary condition. The corporation previously were repeatedly appealed to, on behalf of the citizens, to perform their obvious duties, but the corporation was too intent on promoting political or partizan objects, or projecting sinister Bills for Parliamentary powers, all tending to burthen the city, benefit private individuals, and eventually to end in smoke. After some deliberation on the part of the individuals who convened the meeting to consider the sanitary state of Dublin, an association was formed, called "The Dublin Sanitary Association," with the following objects:—"First, to create an educated public opinion in regard to sanitary matters in general. Secondly, to direct attention to those points in which the existing powers for the maintenance of the sanitary condition of the city are either not duly exercised or are inadequate, or in which the machinery at the disposal of the sanitary authorities is insufficient. Thirdly, to watch the course of sanitary legislation on behalf of the public. Fourthly, to form a body in whom the public may have confidence, and through whom they may, if necessary, act." A prospectus, setting forth these objects, was issued, inviting at the same time the sympathy and assistance of the citizens. Now, all these objects were undeniably good, and pressing, and the endeavour to effect them was most commendable. The association was founded, appointed its own officers, and performed the voluntary work of sanitary inspection by the aid of its own officers or members, and has been the means of leading, since its formation up to the present, to some reform.

At a general meeting of the Dublin Sanitary Association, held recently, the working committee brought up their report, giving a detail of the labours of the Association since its formation in May. It appears that the committee from time to time furnished weekly reports of inspection of nuisances to the Public Health Committee of the Corporation. The Corporation were ready enough to avail themselves of the assistance of the Sanitary Association, but pleaded their usual excuse, inability to financially assist the Association in any way, although the volunteer body were actually carry-

ing out a course of sanitary inspection at their own cost and loss of time that the Corporation itself should have performed. The Public Health Committee admits there are in the city more than 1,000 houses unfit for habitation in their present state, also many houses deprived of the means of drainage owing to their defective construction. The Public Health Committee of the Corporation forget to add that the Corporation maintain in five districts of the city five monstrous aggregations of filth, or manure and sewage deposits. These depôts of manure have been for a length of time chronic institutions with the local authorities, and are retained for the purpose of coining money. In keeping this filthy manure in the heart of the city for sale, the Corporation is at the same time killing the inhabitants. How can the Corporation of Dublin consistently proceed against individuals retaining filth or manure in their back yards, when they show such a bad example to the citizens?

From our own knowledge of the city, we can safely say that, instead of 1,000 houses unfit for habitation, the number might be safely tripled; and instead of excusing neglect on the plea that the houses are badly constructed, which, no doubt, many of them are, the defect is more for lack of proper drainage in the city than in construction. If a proper system of town-drainage existed, house-drains could soon be provided, and their outfall procured.

Dr. Grimshaw, at the meeting of the Sanitary Association, boldly said that certain houses in the city were dens of fever. He traced, some time ago, himself, 1,825 cases to these haunts of fever, and found that a large number of them originated from a small number of houses, 125 houses having furnished 517 cases. These were all on the south side of the city. During the last fifteen years Dr. Grimshaw, who is a practising Dublin physician, found that there had been admitted into two city hospitals 42,534 cases of fever, and this number was exclusive of the fever statistics of the *Mater Misericordia*, Stevens's Hospital, the Meath Hospital, Sir Patrick Dun's Hospital, and the Baggot-street Hospital. Fifteen hundred citizens of Dublin died of small-pox alone, which is one of the most easily preventible of diseases. There are few sensible men who will not agree with Dr. Grimshaw when he says, "The greater portion of the disease that we have amongst us is preventible, and has arisen from directly violating the laws of God."

Notwithstanding the terrible exposure which the report of the Dublin Sanitary Association, as well as the proceedings of their general meeting, have given of the management of the city, the corporation has nothing but excuses to make on the one hand, and promises on the other. To teach the science of health by inculcating the laws for the prevention of disease, instead of the laws of the cure, was at one time considered heresy, and is still adjudged such in more than one quarter of the British islands. *Preventive medicine before curative.* If it be a schism to preach this doctrine, it is a glorious schism to die in defence of. Let Ireland be inoculated with this schism, let it be the lymph of her sanitary vaccination, and her posterity will rejoice in their strength. Be it remembered at the same time that sanitary education, like scholastic, if it will not be accepted where it is necessary for the interest of the commonwealth, must be made compulsory, until it takes root in the habits of the people and the mind of the age.

TECHNICAL EDUCATION AT THE CRYSTAL PALACE.

MUCH has been spoken and written of late years concerning the contrast presented between the United Kingdom and different countries of Western Europe, little Switzerland inclusive, regarding the means provided for technical instruction, but comparatively little has been *done* as yet in the way of remedying the defect. True, there are the Royal School of Mines in Jermyn-street, the Royal School of Naval Architecture at South Kensington, the Department of applied Sciences at King's College, a Department of Civil and Mechanical Engineering at University College, London, and engineering classes in the Universities of Edinburgh, Glasgow, and Dublin, at Queen's College, Cork, and Owen's College, Manchester; but none of these "chairs" or provisons have the rank or capabilities of the Continental *Écoles Polytechniques*, and are only fit, if they can do as much, to qualify students to enter such Institutions. The lectures and text-books of the English schools may be unexceptionable, but to practical as well as theoretical technical instruction and training they make no pretension.

It is gratifying to know that a really practical school of mechanical engineering, available for London and the districts near it, is about to be opened under the auspices of the Crystal Palace Company at Sydenham. Last week a number of gentlemen were invited to the Palace to inspect the drawing-offices, pattern and fitting shops, smith's shop, foundry, &c., that have been fitted for the use of the students. These shops are on three floors at the base of the south tower, with the exception of the smith's shop and foundry, which are to the north of the tower, and on the ground immediately adjoining. The tower is practically circular, and 48 ft. in diameter. The smith's shop and foundry has a furnace suitable for such comparatively small castings as will be undertaken; for smithy purposes it is furnished with two smiths' fires and two anvils. The basement of the tower will be used for stores, and the first-floor for engine-fitting, principal's office, timekeeper's box, and so on. The machine tools, which have been specially designed and ordered for the shop, include shaping, planing, slotting, drilling, and other machines, with three lathes, and a beam engine to supply the necessary power. The second floor is of the same dimensions of course, but divided across the centre, one half being for pattern-making, turning, and wood-working generally; the other half being a drawing-office. The third floor is also divided across the centre, and one half devoted to the lecture-theatre; the other half being intended for a mess-room, for such of the students as may wish to use it. It need scarcely be said that benches with vices for metal work, and benches for sawing, planing, and working wood, are supplied in the respective shops, which, being glass all round, have abundance of light, and are in other respects well adapted for the uses to which they are to be applied.

It is intended to divide the year into three terms of fifteen weeks each, and that the students should devote one term of the course to the study and practice of mechanical drawing, one to pattern-making and foundry work, and the third to fitting and smith's work. In the drawing-office the students will be employed in making drawings of machinery and constructions from sketches; in tracing and getting out quantities and estimates; and in calculating the strength of materials. In the pattern-shops they will be engaged in preparing patterns or models of engines or machinery. In the fitting-shop they will fit and erect engines of from 3 to 6-horse power, or in other work suitable for the market. In the smith's shop and foundry they will forge and mould and make small castings. Examination by eminent engineers will be held at the end of each term, and certificates will be granted to such students as have attained the requisite degree of proficiency. In case of students not having obtained the three certificates at the end of the course, they may remain as students on payment of a proportionate premium for each, or any, of the departments in which they may have failed. Lectures on engineering subjects will be delivered twice a week; the students are expected to take notes of these lectures, and will be required to work out examples from them between the date of one lecture and the next; they will also be examined upon the subjects of the lectures at the close of each term. Lists showing the students' order of merit will be exhibited. The hours of work will be from 10 a.m. to 1 p.m., and from 2 p.m. to 5 p.m., except on Saturdays, when the school will be closed at 1 p.m. A sufficiently rigid degree of discipline will be maintained. On entering students will be required to see that their names are inscribed in the attendance register. Those who enter late will be required to pass through the principal's room, and to explain the cause of their irregularity. Application must be made to the principal for leave of absence, or for permission to write a letter during school-hours, or to do anything out of the regular course of institution work. Inattention and misconduct, if they should be chargeable, will expose the student to work after hours, and to rustication for such time as may be determined. A warning-bell gives fifteen minutes' margin to clean and put away instruments and tools, cover up drawings, and clean and arrange machines and benches ready for inspection, which takes place before the bell rings for closing.

Mr. J. W. Wilson, associate of the Institute of Civil Engineers, is principal of the school, and will have under him a competent superintendent for the several departments. In Mr. Wilson the students will have the advantage of a teacher who can not only tell them in perspicuous language how and why a thing can and should be done, but one who can also show them how to do it. Mr. F. K. J. Shenton, superintendent of the School of Art; and Mr. Grove, the accomplished joint manager and secretary of the Crystal Palace, have devoted their best energies to this new enterprise, which is, in this country at least, as yet, *sui generis*, and which ought to prove a great success.

WATER-BEARING STRATA.

THE late Mr. Samuel Hughes wrote a treatise on waterworks for "Weale's Series" of rudimentary books, of which there is now a new edition.* A work which shall fully describe the whole practice of supplying towns with water must be of greater magnitude than this one; but in so far as the water-bearing strata are treated of, and the machinery for and cost of pumping water from them go, this is a tolerably complete little work. The nature of springs is fully elucidated, which requires a constant reference to the science of geology; but in the short notice we can give of Mr. Hughes's book, we must pass over this part of it and proceed to consider the water-bearing strata in order downwards from the surface,—downwards, that is to say, in geological order of precession. Water is everywhere found in the drift gravel and superficial sands, in quantities sufficient for individual wants, but not for the supply of towns. In the open and comparatively uninhabited country, the water from shallow wells is often of sufficiently good quality for domestic use, but it never is so in or near a town, even if the quantity obtainable were sufficient. It is to strata at considerable depth that attention must be turned for a supply of water. These are often overlaid with impermeable ground, and have their outcrop at considerable distance from and height above any probable place where a well would be required for the supply of a town. In such a case the clay or other impermeable ground being penetrated, the water rises in the well or borehole, sometimes to or above the surface, and more often to within some short distance of it. The name of Artesian is given to such a well, from the success with which the great well at Grenelle, in the French province of Artois, was sunk, where the water rose many feet above the surface.

The first water-bearing strata arrived at after passing through the London clay are the tertiary sands, which overlie the chalk. These have their outcrop at considerable height along the edge of the basin, and in some cases yield large quantities of water. For instance, in the valley of the Wandle there are about fifteen or twenty artesian wells, which yield a daily supply of from 800,000 to 1,200,000 gallons from the tertiary sands; and in the valley of the Lea, from twenty to thirty such wells yield from 120,000 to 200,000 gallons per day. There are few instances of a single well yielding more than 100,000 gallons per day from these sands.

The chalk, which underlies these tertiary beds, yields large quantities of water. On passing through the chalk, a bed of marl is arrived at, which, in general, holds up the chalk-water, and prevents it penetrating the "upper green sand" which lies immediately below it. The upper green sand yields a few springs in the district west of a line from Farnham to Petersfield, but in general it does not yield much water. Selborne is situated on the upper green sand, west of Woolmer Forest. The wells at Selborne are said to average about 63 ft. in depth. "When sunk to this depth, they seldom fail, but produce a fine limpid water, soft to the taste, and much commended by those who drink the pure element, but does not lather well with soap" (quoting from White's History of Selborne).

The gault clay, which lies immediately under the green sand, overlies the "lower green sand," a famous water-bearing stratum. The common mode of procuring water for towns situated on the gault, is by sinking through it into the lower green sand. When a boring is thus made the water generally rises nearly to the surface, and sometimes overflows it. Wells and borings through the gault are common at Cambridge,

* Waterworks for the Supply of Cities and Towns. By Samuel Hughes, F.G.S., Civil Engineer. Lockwood & Co. 1872.

Biggleswade, Shefford, and all the line of flat clay country through Leighton Buzzard into Wiltshire.

A considerable number of towns are situated either on the lower green sand, or in such contiguity to it that this formation may not improbably, says the author, be resorted to for a supply of water, either now or at some future time, amongst which he mentions St. Neots, Potton, Biggleswade, Bedford, Shefford, Buckingham, Fenny Stratford, Leighton Buzzard, Aylesbury, Thame, Oxford, and Abingdon. Similarly situated are the towns of Wellington, Chard, Honiton, Axminster, Sidmouth, Colyton, Axmouth, and Charmouth. Mr. Prestwick has been led by experiments to suppose that each cubic foot of the lower green sand is capable of absorbing two gallons of water.

Below this water-bearing stratum lies the Wealden clay, and below that the jurassic or oolitic series of alternately porous and impermeable beds, which circumstance gives rise to innumerable springs all over the oolitic country.

Passing through the oolite, and the lias which underlies it, we arrive at the Trias, or new red sandstone formation, the upper part of which consists of clayey beds; but in the lower or more arenaceous part large quantities of water are found, as at Liverpool, Birkenhead, St. Helen's, Birmingham, and Coventry.

Below the new red sandstone lies the Permian series, or the magnesian limestone, into which wells are sunk at Sunderland.

Below this formation we come to the old and tilted rocks, from which but little water is derived; but from their elevated surfaces large quantities of water are caught in reservoirs, and supplied to towns by gravitation. The millstone grit and the mountain limestone, as well as the still older slate rocks of the Silurian and Cambrian formations, shed water for the use of neighbouring towns. The millstone grit itself has scarcely any towns situate upon it, but is very important, especially in Lancashire and Yorkshire, as furnishing the drainage area which supplies water to several of the principal towns in the kingdom by gravitation. Lancaster, Preston, Liverpool, Manchester, Stockport, Bradford, Leeds, and many other towns, are all supplied from the united springs and surface water of the great millstone grit formation.

Mr. Hughes proceeds to well describe the means of pumping water out of these water-bearing strata and the cost of it, and here ends the originality of the book; but he quotes the recognised authorities on the gauging of rivers and streams and the flow of water through pipes. As there is nothing new in these, however, we had better refer the reader to the original writers whom the author quotes,—Coulomb, Prony, Du Buat, Bossut, Couplet, Dr. Matthew Young (and Dr. Thomas Young), Girard, Woltmann, Funck, and Brunning; Eytelwein and Weisbach; Dr. Hutton, Mr. Beardmore, Mr. Blackwell, Mr. Neville, and MM. Poncelet and Lesbros; also M. D'Aubuisson and M. Genieys. These are authorities on the flow and conveyance of water. Mr. Hughes is rather an authority on where it is to be found, and how to raise it to the surface, for the use of towns.

PADDINGTON BATHS AND WASH-HOUSES COMPETITION.

When the parish of Paddington rightly determined to have a proper establishment of baths and wash-houses, the Commissioners who were appointed took pains to obtain information on the subject from other localities, and came to the conclusion to invite not less than six, nor more than ten, architects to submit plans, and to offer premiums of 100*l.*, 75*l.*, and 50*l.*, for the best, second-best, and third-best designs. The instructions to architects included stipulations,—

"That the Commissioners shall be the judges, and shall decide as to the respective merits of the plans sent in, and shall determine as to whom the prizes [premiums] hereinbefore mentioned shall be awarded, and their decision shall be final, and without appeal therefrom.

That the successful competitor shall, if required, carry out the works for a payment of 600*l.*, exclusive of the amount awarded as prize-money; but he is not to be entitled to any prize or payment whatever, unless a substantial contractor will undertake the work at a price not more than 10*l.* per cent. above his estimate of the cost, which estimate must be sent with the plans.

The payment of the sum of 600*l.* shall include all travelling expenses and attendances, and the supply of all plans, working drawings, sections, &c. that may be required. All plans of the successful competitor are to be the property of the Commissioners."

"Every part of the building is to be of the plainest design, consistent with the same being thoroughly substantial and suitable for the purpose required.

The architect is to provide for all gas, water, and drainage; for all necessary steam-engines, boilers, and machinery, wringing and drying apparatus, tanks, mains, and fittings, and the delivery over of the building in a complete state, with all engines, boilers, machinery, apparatus, tanks, mains, and fittings in good working order.

The Commissioners will appoint and pay a clerk of the works until the completion of the building, who will act under the Commissioners and the architect.

The Commissioners (if they decide on taking out the quantities) are to approve of the surveyor selected to take out the same, and the scale of payment. The party employed being responsible to the contractor for the accuracy of his quantities.

Accommodation to be provided for—a Board-room, superintendent's office, two day-rooms for superintendent, four bedrooms, a kitchen and a scullery, and a residence for engineer, next to or over the washhouses.

Three Swimming-baths.—One first-class men's, 90 ft. by 40 ft.; depth, 5 ft. 6 in. to 3 ft. 6 in. One second-class men's, 70 ft. by 30 ft.; depth, 5 ft. to 3 ft. 6 in. One third-class men's, 70 ft. by 30 ft.; depth, 5 ft. to 3 ft. 6 in. Reserve space for a women's bath, 45 ft. by 24 ft.

Single Baths.—28 men's first-class, 64 men's second-class, 10 women's first-class, 12 women's second-class, waiting-rooms for each class of baths.

Washhouses.—Provide 70 compartments for washers, with two troughs in each, supplied with steam. Sufficient drying apparatus. Sufficient wringing apparatus. Sufficient mangling apparatus."

No amount was named, so that competitors worked somewhat in the dark. But the amount of remuneration offered to the architect who carried out the design, 700*l.*, seems to point to about 14,000*l.*, as so respectable a parish as Paddington would scarcely propose less than the ordinary rate of payment to its architect, especially when that architect had run the risk of getting nothing at all for a considerable expenditure of skill, time, and money.

A certain number of architects were then invited, and the following is a list of those who competed, in the order of the estimates accompanying the designs:—

Mr. H. H. Collins, "Non quis sed quid," ...	£30,000
Mr. C. Eales, "O."	30,000
Mr. Saunders, "Utile Dulci"	24,000
Mr. Wilkinson, "Ipsissimæ Conditiones"	23,238
Mr. Edw. Roberts, "Utility and Economy"	22,854
Mr. Gundry, "Natator"	20,000
Mr. Lewis H. Isaacs, "Courthope"	20,000
Mr. Bridgman, "Cleanliness, Convenience, Comfort	19,300

Of these, two put themselves out of court by inattention to the instructions,—Mr. Eales (who is well acquainted with the subject, and submitted a plan well deserving consideration), by adopting a smaller scale than that stipulated; and Mr. Gundry, by not sending his drawings until the morning after the date named for receiving them, and the estimate and particulars later still. The Commissioners, therefore, had only six to deal with, and from these they selected, in double quick time, the design by Mr. Isaacs for the first premium, as we mentioned in our last number; that of Mr. Collins for the second; and Mr. Bridgman's for the third.

An entirely different view of the problem to be solved has been taken by the architects to whom the first and second premiums respectively have been awarded, one having sought to straighten the accommodation as much as possible, compatibly with the instructions (in some cases, probably, it may be found, scarcely meeting them), and the other making it his endeavour to produce a complete establishment, with something like a monumental character. Some expressions in a report made by a sub-committee of the Commissioners might perhaps be taken to justify this latter view.

Modern Italian is the style used by all the competitors except Mr. Edward Roberts, who has adopted and modified the Gothic style, producing therewith a very satisfactory result: the back-front, though simple and inexpensive, is especially agreeable. We must commend, too, his plan, which seems well calculated for economical working,—a matter of considerable consequence, in the long run.

Without wishing to cast the slightest slur upon the Commissioners, who seem to have desired to act in a fair and proper manner, we must express regret that they did not call in professional assistance, and give a longer time than was spent in the consideration of the designs, before coming to a decision. Even now such assistance would be useful.

Considering the time and thought which the competitors have bestowed upon the work, we venture further to submit that the Commissioners would set a good example if they were to advise the payment of a fee to each of the unsuccessful, in part payment of the expenses incurred.

Sir,—I have had a glance at these plans, but not sufficient to enable me to do more than express astonishment that the Commissioners should have ventured (I had almost written *dared*) to determine in a few hours what any professional man, however skilled, would have taken at least as many days to have decided upon. As the first premium was awarded to a design of which the estimate is 20,000*l.*, and the second to one of 30,000*l.*, it cannot be assumed that the price had anything to do with the decision; but the result of the matter will be watched with interest, because the "instructions" are most explicit as to the execution of the works for the sum estimated *plus* 10 per cent. What will the Commissioners do if the tenders for No. 1 should exceed the stipulated amount, or if it should be found that the building when erected is not complete? Will the miserable 3 per cent. commission (which is all that is offered as to No. 1, or 2 per cent. on No. 2) be withheld, or will the architect of No. 1 be called upon to pay the expense of the "quantities" if the tenders be unreasonably above his estimate? But I presume that the premiated designs have been paid for, and there the matter ends for a time. The commissioners should take counsel of some surveyors, who should examine the whole of the designs, and when they have given a rough report of the probabilties of expenditure, then the Commissioners should call in an experienced, unbiassed architect (which they should have done at first) to guide them, inexperienced as they are, in the selection of a design such as they desired,—plain, cheap, and useful.

A Parishioner.

THE SCHOOL BOARD NEW BUILDINGS AND THE VESTRIES.

At the meeting of the London School Board last week, the Statistical Committee presented a long and elaborate report in answer to the charges brought against them by several of the metropolitan vestries, to the effect that they are extravagantly and unnecessarily spending large sums of money in the erection of new schools, and also in the proposed new offices on the Thames Embankment.

The committee endeavour to show that there is no foundation for such charges, and that so far as regards the expenditure in the erection of new schools, it is obligatory upon them under the provisions of the Education Act. They state that the Board has satisfied itself, from a house-to-house inquiry, that provision is needed for 104,000 children over and above that afforded by existing schools, and that the schools in course of being built and to be erected will not provide for the education of more than that number. As regards the Board's new offices about to be built on the Thames Embankment, the committee remark that it is only owing to the courtesy of the corporation that the Board have been able to hold their public meetings during the last two years in the Guildhall, and that they cannot expect to have the accommodation much longer extended to them; and they add that the two houses in New Bridge-street which they rent from the corporation up to Christmas of next year, are at the present moment entirely inadequate for the business of the Board.

With reference to the site, which has been objected to as unnecessarily expensive from its situation, the committee contend that as the School Board represents the whole of the metropolis the offices must necessarily be in some central spot, easily accessible by rail, not only to members of the Board, but also to all those who have business to transact; and that the site which the Board has selected is less costly than several others in a central position which had been examined. The committee further state that instead of the cost of the building amounting to 80,000*l.*, as has been asserted by some of the vestries, they have reasons to believe that it will not cost one-fourth of that sum. The committee also state in their report that the new arrangement made by the Board in July last in the architect's department in reference to the planning of the new schools, will have the effect, during the next two years, of saving upwards of 20,000*l.* The report of the committee was affirmed by the Board.

ON THE ART OF PAINTING.

Monsignor Capel (popularised by "Lothair") has recently delivered a lecture on the "Art of Painting." In the course of his observations he said:—Long discussions had taken place as to whether painting held the first place in the Fine Arts; but, be that as it might, one thing they must be convinced of—that painting represents more truly than spoken language all that is associated with what he might call universal language. Since the division of tongues, we were obliged to learn the languages of different peoples in order to communicate with them; but it was otherwise with painting. The Turk, the Greek, the Italian, the Spaniard, the German, the Frenchman, the Englishman, all looked upon a picture, and to all it spoke the same language. Not only did painting differ from language in its universality, but it delineated with much more precision everything that was to be said upon canvas than it could be said by language. There was no written or spoken de-

scription, however minute, that could possibly be so graphic as that produced by the pencil of the painter. While it was a precise language it was a detailed one. The whole art of painting, and the study of painting, as such, must necessarily be associated with our outward sense of sight, and with our inward feelings, using the word in its broad sense. Painting had distinct elements which would constitute the interest in examining pictures. They had commonly heard persons in a picture gallery, stopping before some subject or portrait familiar to themselves, exclaim "How wonderfully like this is." That was what painters call Illusion. There was the mere production upon canvas by the painter's pencil of that which was external to himself. But that mere imitation of what was to be found in the outer world did not constitute that which was embodied in the idea of fine art. Yet they must not entirely reject the mere imitation itself, but while examining what was mere imitation they must cultivate a facility of comparison of the thing represented with the representation before them. It was difficult for those who lived under western skies and European civilisation, and who were familiar with a wet climate, to realise what was meant by the burning sky, the clear atmosphere, and the strange costume of those who lived in the East. Their duty as to that, therefore, was not only to observe, but to extend their own personal knowledge by reading and inquiring about the countries and peoples of whom they knew nothing. Under the general head of Imitation must be included landscape painting. All art began with imitation, but when man began to study nature, and the mind developed itself, there came what might be called the second element in art. It was no longer the mere reproduction of the object the painter saw, for he thought he could always see in his object a defect, and thought there was some object of beauty beyond that. There was in his mind, under such circumstances, not man as he saw him, but man with his imperfections removed. So in like manner with landscape. They would remark that the productions of the ideal had two elements in it—the object upon which the mind rested, and also the mind of the painter; and these two combined produced a third element which took its character from them. This was so striking that in all matter of ideal pictures the early associations of the painters' lives would invariably rest.

LEPERS' WINDOWS.

TEMPLE CHURCH, BRISTOL.

MR. NICHOLLS, of the Bristol City Library, writes, with reference to works now going on at Temple Church, in that city; — There is a small niche or window under the large east window of the chancel. Another and larger one exists, also walled up, under the east window of the weavers' chapel. It has been matter of great conjecture what purpose these windows could have served. They were not for use: the larger windows gave already, if anything, too much light. They were not for ornament, that is tolerably certain, for they must have been a perpetual eyesore to any educated eye that chanced to see them, which, perhaps, was but rarely, as they were at the end of the church that was seldom visited outside, and, being behind the altar, they would scarcely be seen at all by the worshippers within. A few days since I met with a statement that a certain church had a grated "lepers' window" at the east end, and I immediately thought of these inscrutable windows in the Temple Church of Bristol. I have visited, and, through the kindness of the vicar, closely examined them, and am satisfied that both these windows were constructed for the purpose of giving to persons outside in the churchyard a view of the altar and the elevation of the Host,—in short, that these were "lepers' windows," giving to those miserables an opportunity of joining in the worship in this obscure corner of the churchyard, which they were by law forbidden to do in the great congregation. Of all the churches in Bristol that of the Holy Cross would have been the one selected for such a means of grace to a class so terribly afflicted, for there can be little doubt that the Crusaders brought the loathsome disease from the East into this country. There were several hospitals for lepers in Bristol and its suburbs; one of these we know for a certainty was on the west side of Redcliff-hill, just two furlongs through the gardens from Temple Church. The sill of each of these windows is about 5 ft. from the ancient level of the outer ground: hence a person standing outside would look up and with ease see the action of the priest, and have a good view at the back of the altar. Each window had a grating, but there is this singularity in connexion with the larger one in the weavers' chapel, that it had, it seems to me, an inner as well as an outer grating. But whatever the inner bars might have been, whether window or grating, the horizontal bars were about an inch higher than those on the outside, so that they did not interfere with the line of sight from a person in the churchyard who wished to observe the ceremony at the altar. Had they been level these bars would have been a great obstruction to the view. The window in the weavers' chapel is larger than that in the chancel, and its filling in may be plainly seen from the inside. The fair inference is that during the interim between the building of the church and the erection of the weavers' chapel, the increase in number of the afflicted demanded more room. The fact, too, that the chancel overlapped the chapel, thus giving a retired, solitary corner, where curious eyes could not annoy the sufferers, or they themselves be a nuisance to others, may have had somewhat to do with an increased attendance, and created the necessity for the later window to be the larger of the two.

THE LATE MR. R. P. BROWNE.

WE have to record the decease of Mr. Robert Palmer Browne, architect, which took place suddenly at his residence, Royal-place, Royal-hill, Greenwich, on Tuesday last, the 17th instant. The immediate cause of death was disease of the heart. Mr. Browne, who was, we believe, in his seventieth year, was originally intended for the Bar, and did not receive any regular training for the profession he afterwards adopted. He enjoyed for many years an extensive practice, and was remarkable for the scrupulous care he bestowed upon his architectural works. He erected several private residences, and had only just completed, at the time of his death, an extensive mansion,—"Redleaf," near Farningham,—for Mr. Hills. He built the wharf belonging to the General Steam Navigation Company at London Bridge, Greenwich Workhouse, and other buildings. He was for many years district surveyor for Greenwich, but resigned that appointment a short time since. He was also surveyor to Huggens's Almshouses, Northfleet. He was a man of varied accomplishments, including music, and will be greatly regretted by all who enjoyed his acquaintance. Mr. Browne was unmarried.

BRICKWORK AND MASONRY IN IRELAND.

THE president of the Institute of Architects of Ireland said, at the close of his address, of which we printed the earlier portion recently:—

We, the architects of Dublin, occupy a most unfortunate position. When we proceed to have our designs carried out (presuming that both architect and employer have got beyond the compo stage), this difficulty at once arises, and has to be got over as best it can,—we have neither bricks nor bricklayers, we have neither good stone nor good stonecutters. This is, perhaps, a startling statement, and one which at first sight does not command ready assent; but a little steady and unprejudiced reflection will, I think, show you that it is only too true. As regards the bricks, there can be no second opinion. If we want good facing bricks, we import them; but the art of laying them is lost. If you will look out a really good specimen of brickwork in the city, you will find that it is 100 years old. The fact is, our bricklayers have become demoralised by the beastly and pernicious system of wigging down the fronts of our brick buildings, and naturally so. It is his and his employer's interest to expend as few bricks as possible in facing a given surface, and to make his mortar-joints as wide as possible; and when the whole face is raddled over, and the joints are filled in with brick-coloured mortar, and nice neat white lines are drawn upon them, who is to be the wiser? And to this vile and utterly abominable practice we architects have been consenting parties. I do hope that, having had your attention called to it, you will consign wigging to the same limbo as stucco and all other such pretentious and contemptible devices, and use your best endeavours to get external brickwork so done as to bear inspection, without any after patching and cobbling. As regards stone and stone-cutting, my thoughts were principally directed to our granite. Of its utter failure in durability our buildings give painful proof. It is a most worthless stone; and, in giving this opinion, I include the Wicklow stone, which is so generally used by us. There is granite of fine quality at Dalkey and Kingstown, but it is used only locally. I only know one building in this city where Dalkey granite is used, and there the difference between it and the Wicklow stone, which is used in the same building, is most striking. The stone commonly used is not merely bad in itself, but, from its peculiar friability, it has led inevitably to slop-work; arrises are anything but sharp, mouldings are merely approximated to, and the whole surface is left mealy and stunted. Compare the material and workmanship of the granite wall of the Thames Embankment with the enclosure wall of Trinity College, and it will be evident to any one that there is reason for saying that, as far as granite is concerned, we have neither stone nor stonecutters. At our opening meeting last year Mr. Harte, county surveyor for Donegal, exhibited to us some specimens of red granite from Donegal. I understand that the quarries there of red and grey granite are about to be worked on an extensive scale by a limited liability company; and as the cost of water-carriage from Donegal would not exceed, and probably would not equal, the cost of land-carriage from Wicklow, it is worth our consideration whether it would not pay, not to mention other advantages, to use it in preference to the granite we are now using.

THE NORTHERN ARCHITECTURAL ASSOCIATION.

THE ordinary quarterly meeting of the members of the Northern Architectural Association was held at the Old Castle on the 19th inst., Mr. T. C. Ebdy in the chair. Mr. M. Thompson was re-elected president, Mr. Ebdy vice-president, Mr. J. Hogg treasurer, Mr. Thos. Oliver hon. sec., Mr. G. W. Hodge hon. solicitor, and Messrs. F. Charlton, J. Johnstone, F. R. Wilson, W. Henman, W. J. Shotton, E. Thornhill, Geo. Connell, T. Reay, and Sept. Oswald the committee.

Mr. Oliver, the secretary, read a paper on "The Newcastle Town Moor Schemes." He referred to the various schemes which have been before the town for improving the moor, and spoke in terms of praise of Mr. Hancock's first scheme. He (Mr. Oliver) maintained that it was better to build in a sanitary way upon open spaces, than to have such spaces for generations unsewered and undrained in the neighbourhood of a large town.

RECKLESSNESS OF WORKING MEN IN REGARD TO ACCIDENTS.

IF the coroners' black lists of deaths of workmen occasioned chiefly by their own carelessness and indifference to life and limb were published in the newspapers it would be a startling record; but it is only occasionally that London editors can find space for a report of a fatal accident. The workmen, however, know it, as when a man killed leaves a family, a subscription goes round amongst his mates to help the widow and to bury her husband.

London house-painters are, perhaps, as a class the greatest sufferers from building accidents, and this too frequently arises from little masters not providing safe scaffolding or sound ladders.

Still, builders, architects, clerks of the works, and foremen may lavish capital, care, and skill on insuring, as far as human power can do so, the safety of the workmen, and all will be of no avail when the men themselves break rules and set danger at defiance. The pipe and the glass have much to answer for in cases of accident, and in none more so than in mining disasters. A coroner's recent investigation in the north of England, by which no fewer than thirty-four lives were in question, disclosed the reckless indifference of men in pits. The "Morley Main" was, from its immunities from serious disasters, looked upon as a safe pit, and both masters and pitmen seemed to consider they dared do anything. The blow came at last, and need it be wondered at? The evidence showed that gas was allowed to accumulate; all preventives were set at naught; gunpowder was constantly used for blasting; naked lights were burnt; and the miners smoked, struck matches,

and forged keys to unlock their safety-lamps. In the pockets of those who were killed at Morley Main Colliery, there were found tobacco, lucifers, and vesuvians. When such conduct as this is carried on, neither laws nor rules are of avail against accidents.

THE BUILDINGS AND WORKS IN THE METROPOLITAN BOARD'S AREA.

IMPORTANT STATISTICS.

At the meeting of the Metropolitan Board of Works last week, Mr. Dresser Rogers, chairman of the finance committee, in bringing up the estimates required for the ensuing year, made some interesting statistical statements in reference to the property under the control of the Board, and the works which had been effected by it. He stated that the Board represented a population of 3,266,987 persons, and that there were at the present time 419,642 houses in the metropolis under their charge. There were 416,511 householders within their district, and the present area over which they had administration was 75,490 acres. The area of taxation over which their precepts took effect, was 117 square miles; the rateable value of the property 20,367,298*l.* and a penny rate over the whole of the metropolis at the present time amounted to 84,863*l.* 14s. 10d. The total length of sewers in the main drainage system completed was 82 miles; the total length of local sewers constructed by vestries and district Boards since 1856, and sanctioned by that Board, was about 700 miles. He further stated that the Board had now determined to take charge of the embankments, which would cost about 3,000*l.* a year, and that various other open spaces had also been brought within the Board's care during the present year. They had also paid during the past year for the land fringing Victoria Park, which had been thrown into the park at a cost of 20,550*l.*, but that as the Government had taken upon themselves the care of the land, the Board was relieved from any further charge in the matter. He added that the Board had incurred liabilities during the past session of Parliament for the carrying out of improvements, which would entail a gross capital expenditure of 2,500,000*l.*, or a net expenditure of 2,000,000*l.*

THE NEW BRIDGE AT PETERBOROUGH

On Friday, the 13th instant, the new bridge from the designs of Mr. John Fowler, C.E., obtained for the town by the joint subscriptions of the counties of Huntingdon, Northampton, and the Liberty of Peterborough, was formerly opened. The structure is Gothic in character. It consists mainly of three arches, two of 35 ft. and one of 70 ft. span, supported on four cast-iron columns, each of 5 ft. diameter, and terminating in abutments of cement concrete, faced with ashlar.

Projecting from the girders are cast-iron cantilevers, carrying the footway and parapet. The bridge is 30 ft. wide and 150 ft. long, and from the Huntingdon side of the river Nene is approached by a bank and retaining walls, some 240 ft. in length, from the designs of the county surveyors.

The cylinders were sunk by excavation and the use of cantiledge, and an old road, upwards of 3 ft. thick, was met with in their descent to the rock foundations; also some good examples of coin of the time of Charles II. were found, and some date stones, which point to the tenth and seventeenth centuries, as the probable date of the origin and restoration of the old bridge, now removed.

The works have taken some nine months to complete, but have been much retarded and disturbed by the excessive floods during the late summer and autumn. They were carried out under the inspection of the surveyors, Messrs. Law & Hutchinson, by Messrs. Handyside & Co., of Derby, and under the immediate supervision of Mr. Woulf Brenan, the resident engineer. Mr. Thackeray, of Huntingdon, was the contractor for the masonry and brickwork.

Purchase of the Dublin Gas Works by the Corporation.—The works, plant, and business of the Alliance Gas Company have passed into the hands of the Dublin Corporation, which body, from the 1st of July next, will be gas-makers for the city.

ANCIENT STONES NEAR STORNOWAY.

The stone circles at Calhornish are comparatively little known. A writer in the *Standard*, who has recently visited them, says:—"At Calhornish the Druidical clusters are two in number, the first and more important, a group of forty-three venerable pillars ranged in a cruciform manner, with a circle at the point of intersection. In the very centre of this circle stands an altar-stone, beneath which is a tank of hewn granite that one can scarcely help supposing was once a receptacle for the blood of the victims slain. So far as I could calculate, the long limb of the cross extends north and south 600 ft., the transverse line 200 ft. Half a mile away to the west, on an eminence nearer by some four hundred yards to the waters of the loch, is another group of these same inscrutable obelisks, disposed, I think, into two concentric circles, but much less distinct in their arrangement, and much more deeply imbedded in moss. Within a space of several miles round these immemorial remains are cairns and monumental stones innumerable. Were the circles themselves places of the old Pagan Celtic worship, and the outlying districts the burial-ground of priests and warriors? Curiously enough *cleichen* is the Gaelic for stones,—such stones as those of Calhornish, Stennis, in the Orkney Islands, and Stonehenge; still more curiously to go to the *cleichen* is the Gaelic vernacular for going to church. The stones of Calhornish were in all probability erected where they now stand long ere the moss deposit had commenced, and this, according to the calculation of competent scientific authorities, who can see in the different layers of the velvety parasite the signs of centuries past and fled, must have been at least two thousand years ago."

QUERY AND ANSWER.

Shall we have pills or paving stones?
Shall we have drugs or drains?
Shall we have air or stifling moans,
And poison'd hearts, and aching bones,
Or homes without these pains?

Is prevention better than cure?
Illness better than health?
Shall we battle, or still endure,
And fain believe our lives secure,
While plague creeps on by stealth?

While doctors differ, let us agree,
To build well, drain, and pave:
Thus we'll stamp out impurity,
And make the poor man's dwelling be,
His home and not his grave?

When we give light and air to man,
Water ample and pure;
Homes fit to live in; then we can
Prove in spite of the world's ban,
Prevention is better than Cure.

ROOF COVERINGS.

Sir,—I see from your columns that the restoration of Worcester Cathedral has called up the much-debated question of the comparative advantages of slates and lead as the roofing material for large churches. So far as appearance goes, I think there can be no doubt as to the superiority of the latter. The defenders of slates support them on the more tangible grounds of cheapness, convenience, the absence of danger from the "careless plumber," and the like. And there can be as little doubt as to the reason of this marked difference in appearance. It is the broken and jointed appearance of slates that mars them, more especially the unavoidable horizontal divisions. Lead has much fewer joints, and those are all vertical. Will, then, the architects and other professionals pardon a mere amateur student of architecture, who knows very little about construction, and generally prefers to judge works of art by their appearance, if he ventures to make a suggestion on this important point? Could not the roofs of large buildings be covered with a kind of cement, which would be without the chief objection to lead roofs,—the "careless plumber,"—and the second objection,—their enormous cost; which would be cheaper at the outset, and would require less frequent repairs, than either lead or slate; which would be lighter, and what is of great consequence, a worse conductor of heat, than either; which could be repaired with the greatest expedition, and by the simplest means, when it became defective in any point; which would be free from the pettiness of the jointed slate roof, and might be left in one unbroken expanse, or, if it were thought desirable, might receive some vertical divisions, like those which add lightness to the effect of a lead covering; and which might, at the architect's discretion, be made of such a colour as would best harmonise with the tint of the stonework of the building, as slaty blue certainly does not always do. Details of construction and the like I will not venture to speak about, my architectural studies being purely artistical; but, supposing it to be a constructional possibility, I am convinced that, with an appropriate cresting, such a roof would have an effect far better than one of slate, and, at least, as good as a leaden one. To the architects, then, I leave to decide what my suggestion may be worth.

In Statu Pupillari.

BRITISH GOODS SENT ABROAD.

A subscriber in Rio de Janeiro (Mr. T. E. Parker), who says he obtained from England a certain wood-working machine, in consequence of a notice of it in our pages, writes to us very strongly to complain of its incompleteness and the want of proper instructions accompanying it. If this paragraph should meet the eye of the manufacturer he will doubtless inquire into the matter. Our correspondent says, at the conclusion of his letter, and there is much truth in the observation,—"If my workshop had been in London instead of Rio de Janeiro, I know perfectly well that I should have had no cause to trouble the *Builder* with any complaint of this sort. And this, a most important matter, should be remembered by all who have an interest in British manufactures. If you will not care or interest yourselves in goods sent to a foreign country, you may depend upon it there will soon be others who will."

LOCAL BOARD'S LIBERALITY.

A correspondent writes:—The "Standish-with-Langtree Local Board" have offered by advertisement 20*l.* a year for a "professional engineer and surveyor to the Board." I hope you will draw public attention to it, showing the absurdity of such an appointment with such a salary, when I tell you that the population of the district is close upon 4,000; the area, 3,264 acres; the rateable value, 19,500*l.* nearly; and the length of roads repairable by the Board between ten and eleven miles. The poor engineer and surveyor is to be paid at the rate of 7s. 8½d. per week! What next?

LADIES' SANITARY ASSOCIATION, MANCHESTER.

The annual meeting of the Ladies' Sanitary Association was held on the 18th inst., in the Mayor's Parlour, at the Town-hall. The Bishop of Manchester occupied the chair; and amongst the other gentlemen present were Mr. Hugh Birley, M.P., Dr. Crompton, Mr. Alderman Davies, and Dr. Syson.

The Secretary (the Rev. C. Keeling) read the annual report, of which the following is an abstract:—"With increased income, and additional ladies willing to give personal superintendence, the Association had been able to extend their operations and to carry out some of the plans sketched in former reports. Beginning the year with four mission women, the committee felt they were justified in increasing the number to nine directly after the annual meeting. These ladies had been at work throughout the year, and the committee were thankful to be able to say that they had never had any reason to think of retrenchment lest the necessary funds should fail. All of these nine women had been, with two exceptions, permanently located. This was better than the old plan of changing them from district to district, for the work now became permanent, and the good could be followed up. Ladies had also by this means been encouraged to take up a poor town district permanently. The work had been carried on through the whole year in the following districts: St. Michael's, Angel Meadow; St. Oswald's, Collyhurst; St. Matthew's, Campfield; St. Luke's, Chorlton-on-Medlock; St. Silas's, Ardwick; St. George's, Oldham-road; two districts in Salford, suggested

and marked out by the medical officer of health, for nine months in the year in St. Peter's, Oldham-road, for three months in St. John's, and St. Ann's, Deansgate, and Jenkinson-street district, Oxford-road. In all these cases the mission woman had been superintended, and more or less accompanied, by a lady. Domestic teaching of almost every kind was being carried into the homes of the people as heretofore. The disinfecting powder and the medical soap were the keys by which doors and hearts were opened. There were so many irritating and degrading discomforts against which these simple remedies secured them, that the poor were most grateful for the agents' visits, and showed every willingness to profit by their teaching. Large quantities of disinfectants had been distributed, and it had been noticed that the districts in which this had been most done had been unusually free from fevers and similar disorders. Special attention was given by the committee to the districts visited by the Medlock floods. The balance-sheet of the society showed an excess of income over expenditure of 100*l.*, of which, however, 75*l.* was the balance from the previous year. The total donations and subscriptions included in the income amounted to 371*l.* 12*s.* 5*d.*"

Mr. Hugh Birley moved the adoption of the report.

Dr. Crompton seconded the motion, which was carried.

Mr. Alderman Davies next moved,—"That this meeting recognises thankfully the extension during the past year of the home sanitary work, and appeals to the ladies of Manchester and Salford for increased support." This was agreed to.

SANITARY MATTERS.

St. George's, Hanover-square.—Dr. Corfield, the new medical officer of health, reports to the local works committee that he has instructed his inspector of nuisances to order the waste-pipes of drinking-water cisterns to be disconnected from the traps and soil-pipes of water-closets, and to be diverted so as to discharge into the open air, either over the surface of the roof or yard, or into a rain-water pipe not connected with a sewer.

Bucks.—A conference of the sanitary authorities of the county of Bucks has been held at the Police-court, Aylesbury, to discuss the advisability of combining in the appointment of a medical officer of health under section 10 of the Public Health Act. Delegates were present from Amersham, Buckingham, Newport Pagnell, Winslow, High Wycombe, and Slough, rural; and Aylesbury and Buckingham, urban. Sir Harry Verney, M.P., presided, in the absence of the Duke of Buckingham. Mr. J. Henley, Poor-law inspector, said he had called the meeting in pursuance of a requisition received from the Aylesbury Local Board. There were in this county seven urban and seven rural authorities, and fifty-one districts, with each a medical officer. He strongly urged that in order to secure independence, efficiency, and economy, two or more sanitary authorities should combine in the appointment of a medical officer. Oxford and other counties had taken advantage of this part of the section of the Act, and several other counties were about to do so. The Rev. G. Phillimore opposed Mr. Henley's scheme. He thought the object of the Act would be best secured by the appointment of the district medical officers. The combination of districts as suggested by Mr. Henley was negatived by nine to eight.

Gloucestershire.—A conference of representatives of the urban and rural sanitary authorities in the county has been held at Gloucester, to discuss the appointment of medical officers under the Public Health Act. Mr. Longe, Poor-law inspector, suggested that the county should be divided into three areas, and a medical officer appointed for each district. The first district comprised the unions of Gloucester, Wheatenhurst, Dursley, Westbury-on-Severn, Newent, Chepstow, and Tewkesbury, with a population of 119,000. The second district, Cheltenham, Stroud, Cirencester, Northleach, and Tetbury, with 130,000 inhabitants; and the third district, Clifton, Thornbury, and Chipping Sodbury, with 163,000 inhabitants. Stow-on-the-Wold and Winchcombe unions he proposed to connect with either Shipston-on-Stour, Evesham, Alcester, or the Stratford-on-Avon unions. He suggested that a medical officer should be paid a salary of 800*l.* per year, and said he had estimated this would involve a cost of from a farthing to a halfpenny in the pound. Ultimately the following resolution was carried by a small majority:—"That the opinion of this meeting is in favour of the appointment of one medical officer to superintend the sanitary arrangements of the whole county; and that this opinion be communicated to each union for their consideration."

SCHOOL BOARDS.

London.—The Works Committee received the following tenders for the erection of a school to provide accommodation for 964 children, on the site in Cottenham-road [not the York-road site, of course], Finsbury:—Newman & Mann, 7,249*l.*; B. E. Nightingale, 7,189*l.*; Williams & Son, 7,160*l.*; Wicks, Bangs, & Co., 6,980*l.*; L. H. & R. Roberts, 6,944*l.*; Adamson & Son, 6,941*l.*; D. King & Son, 6,892*l.*; J. High, 6,790*l.*; Patman & Fotheringham, 6,710*l.*; Niblett & Son, 6,630*l.*; Scrivener & White, 6,471*l.* The committee recommended the acceptance of the lowest tender, that of Messrs. Scrivener & White, amounting to 6,741*l.*

North Walsham.—The choice of a plan for the new buildings came before the Board. Mr. Phipson, of Norwich, architect, was present to advise as to the relative merits of the different designs presented. After going through the whole, the difficulty was to decide between the plans numbered six and twelve, which, when the notes explaining the mottoes were opened, proved to be those of Mr. Bottle, of Yarmouth, and Mr. Gaymer, of North Walsham. It should be understood that Mr. Scott, though a member of the Board, acts as honorary clerk, and in this capacity was able to gather from the correspondence he had carried on with the competitors, and from the personal calls which had been made upon him, who the gentlemen were that had sent in plans, and with this knowledge he gave the Board to understand that he should not vote upon the question, and accordingly did not do so. The choice has fallen upon the plan sent in by Mr. Bottle, of Yarmouth.

THE ANCIENT DEFENCES OF SOUTHAMPTON.

AT the head of the inlet known as Southampton Water, between its two principal tributaries of the Test or Anton and the Itchen, intervenes a considerable neck or tongue of gravel, which is thus bounded on three sides by water, and is a position of considerable natural strength, and the more valuable that it overlooks a fine roadstead, having the Isle of Wight for its breakwater. By whom this spot was first occupied is unknown. Bittern, an unquestionable Roman station, under the name of Clausentum, is nearly two miles farther up the Itchen, and upon the opposite bank. Even the origin of the present name of the town is a subject of dispute. The "Anton" presents a tempting source, but it seems most probable that the name means simply "the town of the southern dwelling," as opposed to Northam, a place close to the Roman station. Certainly the name has no reference to Northampton.

"Hamtunscire" is mentioned in the Saxon Chronicle in A.D. 755, and the town was a Saxon place of some mark, coining money in the reign of Athelstane, and occasionally plundered by the Danes. Canute held it, and his experiment upon the advancing tide is said to have been tried in Southampton Water.

Southampton is named in Domesday, and the Normans found it a convenient port both for military and commercial purposes. It was visited and maintained by the Plantagenet monarchs, who here mustered and embarked their troops for Normandy. Hence the town was fortified from an early period, both after the Saxon and the Norman fashion.

The walls enclosed a roughly rectangular space, averaging about 370 yards east and west by 770 yards north and south, but in actual circuit about 2,200 yards, or 1¼ mile. This area is divided lengthways by the main street, but the western is the larger moiety, partly because it contains the older castle, and partly because of an irregular projection upon what is called the "tin shore." The north and south gates were upon the main street. There was an east and a west gate, but not at all opposite to each other, nor were the roads cruciform. There is no reason for attributing to he moderately rectangular plan a Roman origin. It was probably dictated by the general figure of the ground.

The surface of the area varies from 15 ft. to 35 ft. above the adjacent sea level. The northern half is higher than the southern, the western than the eastern. The highest ground, therefore, is in the north-west quarter, where was the castle.

In consequence of this, the wall of this quarter, towards the west, is built against a scarped bank, and is a revetment 30 ft. high, whereas elsewhere the wall is built upon ground nearly level, or at best not above 3 ft. or 4 ft. higher on the inner than the outer side. Beyond the castle there is no considerable earthwork, and no reason therefore for attributing the defences of the town proper to a period earlier than the incoming of the Normans.

The earthworks of the castle are, on the contrary, considerable. The naturally high ground was scarped and pared and somewhat raised, and near the centre of the area the highest point was surrounded by a circular ditch, the contents of which, thrown inward, converted the raised platform into an artificial mound. This, beyond doubt, was the Saxon fortress.

The later rectangular area was also well defended. It had the sea for its ditch nearly at the foot of the wall along the west and south fronts. Along the east a broad and deep ditch, wholly artificial, and in part, at least, admitting the sea, ran along the foot of the wall, and divided the town from a strip of lower land, which slopes towards the Itchen, and is now covered by an important suburb. Along the north front a ditch, also artificial, was cut across the ridge; it is said, to a depth allowing it to be filled from the sea. As this would involve a depth of about 40 ft., with a corresponding breadth, the tradition is probably an exaggeration.

The north and east walls, least affected by any irregularities of ground, and nearly straight, are in length about 318 and 790 yards. The south and west fronts are curved and broken to suit the ground, and measure about 320 and 650 yards. The south-west angle is largely rounded off. Of recorded gates, there were the north or Bargate, still standing; the east gate, removed; the spur gate, remaining; the south, or water gate, removed; the west gate and the postern, preserved; Biddles, or Bridle gate, gone; and the castle water-gate, closed up.

The mural towers were chiefly drum, or half-round. The north front is flanked by two drum towers, and west of the Bar is one, and east of it two, half-round. Upon the east wall, north of the east gate, was one; and, south of it, six, of which one remains, half-round, and one rectangular. At the south-east angle, the south wall was prolonged eastwards as a spur tower, covering the ditch; this remains. Upon the south wall there were six towers, including the south flank of the spur gatehouse, and, on the opposite flank, the Bugle tower. All but one are half-round. The west wall had many buttresses, and few towers. There was one where the south wall of the castle joined the town wall; and near the north end is a fine half-round tower,—an addition.

Passing to the details, the north gate, called the "Bar," is a large handsome structure, about 60 ft. broad by 60 ft. deep in the centre. It is of two stages, pierced below by a central and two lateral passages, and contains above a chamber, 52 ft. long by 21 ft. broad, used for public purposes. In each wing is a staircase. That to the east is old, that on the west may have been so. The side passages are modern. They communicate with the central roadway by two cross arches on each side, of which the two next the north are original, and probably led into the flanking towers. An examination of the central passage shows the original gate to have been Late Norman; at least a round-headed portal there placed is probably in that style, though it has rather a Decorated aspect. Then in the Early Decorated time two bold half-round flanking towers were added, and still remain. At this time the rear was probably re-faced, and four windows and a centre niche inserted, and the council-chamber enlarged, and probably the east staircase added. The Norman gatehouse had an upper room, of which a round-headed door, with a foliated head, remains. Next, in the Perpendicular period, a bold projection, three sides of an octagon, was added to the front. The gateway thus advanced is flanked by two bold narrow buttresses, which run up to a very bold corbel table, having six machicolations in the central face, and three in each of the obliqne lateral ones. The battlements are good Perpendicular, and carried round the rear towards the town; one embrasure is occupied by an alarm-bell

This gate has been much injured by restorations. The openings to the rear, archways and windows, have been re-faced; but they preserve much of their old type, and have a Decorated aspect. The main passage has been cut away and widened, and the portcullis grooves are gone. When the ditch in front was filled up, a century ago, all trace of the drawbridge was lost.

West of the Bar much of the wall remains, but is so blocked in by houses as to be invisible. Forty-six yards from the gate is the site of a half-round tower, beyond which the wall extends in a straight line to Arundel tower, so called from Sir John Arundel, an early governor. This is a drum, 22 ft. in diameter, which caps the north-east angle of the town. This tower is 50 ft. to 60 ft. high, and seems to rise out of a rectangular mass of masonry, possibly added to strengthen it. Here the internal level is 30 ft. or more above the external, being a part, no doubt, of the old earthworks.

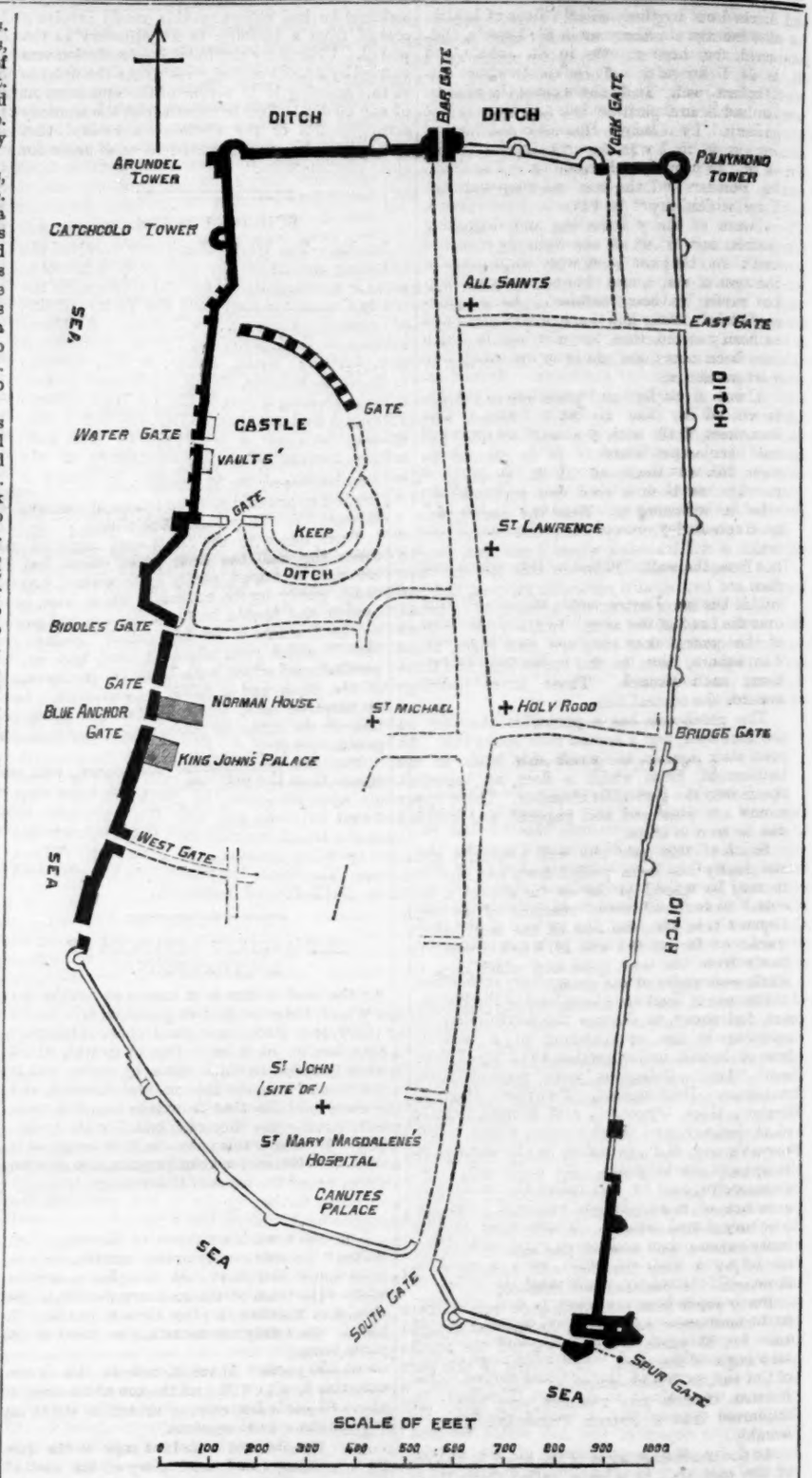
Continuing along the west wall, at 763 yards is a bold half-round tower, 20 ft. diameter, and 30 ft. high, of excellent rough ashlar, with bold machicolations at the level of the adjacent curtain. This is Catchcold Tower. Built against the bank it looks solid, or like a bastion, but it is said to be hollow, though how entered does not appear. This tower, with the adjacent wall for some feet, is apparently a Perpendicular addition to what seems to be a Decorated wall. Beyond the tower is a flight of steps, modern, ascending 30 ft. to the summit of the wall, which is there common to both town and castle. The wall then runs forward obliquely, probably to allow of the inclusion of the earthworks of the castle. It seems in substance Norman. The salient is capped by a rectangular buttress, the hollow angles of which on each side are crossed by low pointed arches, pierced as garderobes, as at Porchester. This buttress tower is of Decorated date.

Then follows about 134 yards of straight wall, probably Norman, about 38 ft. high, and backed to the summit with earth. Upon it a small rectangular buttress marks the junction of the north wall of the castle with the town-wall. Further on are five rectangular buttresses of various dimensions. The three first are evidently additions upon the Norman wall, the rest seem original. Part of the wall here is divided into two stages by a bold horizontal bead. Below are two narrow windows of about 18 in. opening, resembling large loops, and which seem to have had square heads. Above are traces of two windows, apparently round-topped. There must have been an interior chamber, now closed. The central buttress is broad and flat, and here are traces of the old water-gate of the castle, which must have been reached by steps, the ground behind being above 30 ft. high. Close north of this water-gate is a large vaulted chamber, built against the town-wall, and now closed. This part of the wall ends in a rectangular projection, probably the root of a tower, and marked the junction of the castle south wall with the town-wall.

From hence the wall is low and thin for about 33 yards, marking the end of the castle ditch, and on the rising ground of its counterscarp is the root of another square tower, marking the recommencement of the regular town-wall, which then turns inwards so as to protect Biddles Gate.

This gate, now removed, opened into a steep and rather narrow ascent called Simnell-street, out of which, on the north side, opens Castle-lane, thought to represent an old entrance to the castle.

At Biddles Gate commences a very curious part of the wall, which, as far south as a little beyond Blue Anchor postern, is unlike anything known in England. The original wall, here about 30 ft. high and 4 ft. thick, with the soil nearly level within and without, seems to have served not only for the town-wall, but for the wall of several dwelling-houses within it, the doors and windows of which are visible in the wall, though now closed up. These openings show the wall to have been Norman, and of a moderately early period. This wall was not found sufficiently strong for the purpose of defence, and a second wall, also 4 ft. thick, was built against it on the outside. But this second wall was built like an aqueduct, as an arcade, upon tall and slender piers, about 2 ft. 2 in. broad, from which, at 10 ft. 6 in. high, spring arches mostly semicircular, but some pointed, and two very flat and probably much later, above which was the parapet. The arches are about 12 ft. span. The result was to increase the rampart to a walk of 5 ft., with a parapet of 2 ft., and probably a rear wall of 1 ft. Of course, an arcade so placed afforded great shelter for those attacking the wall from without; but to obviate this, while the piers touched the wall, a space like that for a portcullis, a chase about 2 ft. broad, was left between the arch and the wall, by means of which any one standing at the base of the wall could effectually be molested with missiles or a long pike. Eighteen arches of this arcade remain. The arrangement is a very curious one, and supposed to be singular. This masque or outer wall may be of late Norman date, but is possibly Early English. The piers interfere much with the earlier doors and windows. The wall where double is 35 ft. high. There are traces of some kind of building outside a part of the wall.



Plan of the Ancient Defences of Southampton.

A hole broken through the wall into Blue Anchor-yard, shows the rear of the wall, and a little further south is Blue Anchor postern, an original archway in the wall, much cut about and enlarged, but of which the portcullis chase worked from the battlements, still remains.

From the postern a very steep winding narrow lane leads up into the town, between lines of ancient houses, of which two, one on each side, next the gate, are Norman. Both are curious, but that on the south side especially so. It is the shell of a Norman house, of the age of the older part of the wall. It is called locally King John's Palace, but is in truth an ordinary Norman private house, and a very curious one. The principal room was on the first floor. The roof is gone, but the door and windows remain.

These are coupled, small, round-headed, and divided by a short column, with a slightly sculptured capital. The space within the walls is 43 ft. by 45 ft. There is a good Norman fireplace, with hood and flanking columns. In the south and part of the east wall is a mural gallery. The house on the northern side of the lane is 44 ft. by 15 ft. There is a good view of the town wall, and a plan of the two houses, in Parker's "Domestic Architecture of the Twelfth Century" (p. 34).

South of the postern the wall ceases to be double, and is all of one date, and about 6 ft. thick. In this part is a flattish rectangular mural buttress tower, much blocked in with houses, but having its south hollow angle crossed by a garderobe. Near this is a high pointed doorway, evidently an insertion, of 24 ft. opening, leading into Collis-court, and about 60 ft. further is the west gatehouse.

This is a perfect and plain rectangular gatehouse, 30 ft. deep by 24 ft. broad, without buttresses, flush with the wall outside, and of bold projection within. It is pierced by a high pointed vault, of 12 ft. opening. The passage has been a good deal mutilated with a view to widening it. Near the centre was a good recessed doorway, the profile of the head of which is still traceable where it has been roughly cut from the wall. Between this and the inner face are two square portcullis grooves, and just within the inner entrance is a chase, 18 in. broad, over the head of the arch. In the vault, in front of the central door-case, are nine holes, about 4 in. square, three in the crown line, and three along each haunch. These latter converge towards the central line.

The gatehouse has a portcullis chamber on the first floor, and a second floor above this. An open stair against the south side leads to the battlement, from which a door, an insertion, opens into the portcullis chamber. These upper rooms are plastered and papered, and nothing can be seen in them.

South of this gate the wall gradually sinks, and finally has been pulled down and removed. It may be traced as far as the site of a half-round tower, and some remains of an arch. Beyond this, also, the line of the wall may be traced as far as the site of Bugle tower, 180 yards from the west gate, and which caps the south-west angle of the town.

The south wall is almost wholly destroyed, and the foundation either removed or covered up by the broad and handsome quay which now intervenes between the base of the wall and the sea. This front was more or less convex, or rather polygonal, the angles being capped with drum towers. There are some traces of the south gatehouse. In the rear of this part of the wall are the site of St. Mary Magdalene's Hospital, and in Porter-lane what was called Canute's Palace. A representation of the south gate before 1784 is preserved by Grose. It had a low, broad Edwardian arch, with bold machicolations above, and toward the east it was protected by a long flanking wall, parallel to its approach. It was removed 1830-40.

Forty yards from the south gate was another half-round tower, and thence the wall ran straight east for 83 yards, when it reached the south-east angle of the town. In the rear of this part of the wall, in Winkle-street, is "God's House," a Norman church, now restored very badly, and converted into a French Protestant place of worship.

At the south-east angle of the town, in the end of the east wall, is a gate, called God's House Gate, or South Gate, but which should be called Spur Gate, as it opens upon a work of that class. This gate-house is rectangular, quite plain, and without buttresses, having two upper floors. Its dimensions are 28 ft. broad by 23 ft. deep, and the south end projects as a low salient of two faces, upon the south wall, now removed. The passage is vaulted with a high pointed arch 12 ft. broad. Like the west gate, it had a central recessed doorway, now much cut away, and two portcullis grooves. The vault in front of the door is supported by two, and in rear of it by three, cross-ribs. Altogether in substance this gatehouse resembles that of the west gate, and is of Early Decorated date. Its front may have been rebuilt when the spur tower was added.

The spur work projects from the northern flank of the gate of the gatehouse for about 80 ft. It is composed of a sort of lofty gallery, or curtain, terminating in a rectangular tower, about 22 ft. square, with buttresses capping the two east or outer angles diagonally. It is of three stories, and is built across the eastern ditch, no doubt to contain and protect its sluice communicating with the sea, which originally flowed up to the wall of the tower. There are seen large arches in the north and east faces, which look as though there had been a passage for boats; but these seem really to have been arches of construction only, intended to throw the weight of the building upon the corners, which probably are more deeply founded than the curtain. In the north face is also a large modern arch, a relic of the canal which was to have been carried beneath the tower. The spur-work and the gatehouse were long used as a Bridewell. All still bear marks of that degrading occupation. The whole spur-work is good Perpendicular. Leland calls this the south gate, and the spur tower the Castellet. Grose gives a view of it about 1770. From the Spur-gate the town wall is tolerably perfect as far as the first half-round tower, 60 yards. From hence the wall may be traced 35 yards to a flat buttress, 14 ft. broad and 3 ft. deep, of which there are some remains. Beyond this, at 37 yards, is the site of a rectangular tower, 30 ft. broad and 24 ft. deep. These two are said to be additions of the time of Edward VI. They look much older.

From hence to the north-east angle of the tower the wall has been pulled down, but its line may be traced, partly by occasional foundations, partly by its materials which have been used in the houses built on its site, and partly by the direction of the lane called "Back o' the Wall," which runs along its rear, and by the parallel road which runs along the counterscarp of the ditch, and is called "Canal-walk," from an abortive canal which was carried along the line of the ditch at the commencement of the present century.

The east gate spanned East-street, and was taken down in 1772. Grose gives a drawing of it, and attributes its erection to the year 1339, 13 Ed. III. Between this gate and the north-east angle was one mural half-round tower.

Of Polnymond Tower, which caps the north-east angle, there are considerable remains. It is a three-quarter drum tower, about 28 ft. diameter. From it to the bar, 160 yards, the wall, or part of it, remains, but so clustered with buildings as to be inaccessible to ordinary visitors. Here are remains of two half-round towers, and a breach in the wall, called York Gate, probably representing a postern.

The east ditch is marked by a depression, in part due to the canal. The north ditch is completely obliterated and built over, and its breadth is not recorded, and has not been ascertained by probing. If Hanover-buildings mark its counterscarp, it was 46 yards broad; but if, as is much more probable, its limit is marked by Cold Harbour, it was only 24 yards, which tallies with that along the east front.

THE CASTLE.

The castle was very probably the oldest, and perhaps the only præ-Norman fortification connected with the town. It occupied nearly the whole of the north-western quarter of the walled area, and included also the highest ground. In plan it was a rough semicircle, the chord of 124 yards being the town wall, and the arc measuring about 300 yards. There is, however, also a considerable knoll, on the south-east of the area, of about 45 yards diameter, about half of which lay outside the curved *enceinte*.

This was the keep. Leland calls it the dungeon (donjon), and the "glory of the castle." "It is," says he, "both large, fair, and very strong, "both by works and by the site of it;" and other writers describe it as a lofty mound. As usual, in forming such works, advantage was taken of high ground to make it the base of an artificial mound encircled by a deep and broad ditch. The keep, no doubt a shell of masonry like Arundel, towered above the rest of the works. Of the curved wall of the *enceinte* a part remains to the north. It was built on piers about 8 ft. square and 9 ft. apart, a round-headed arch with a tendency to a point connecting these. The tops of these arches were about 12 ft. above the base of the piers, and upon them rested a wall, which carried the battlement. The arches were buried in a bank of earth about 15 ft. high. This bank has been removed to allow houses to be built up to the wall, which now, therefore, stands like a Roman aqueduct. The foundation is excellent, so that this plan was adopted solely to save material and to profit by the older bank. The roughness of the masonry shows the height of the bank, above which the remaining wall rises about 4 ft. It is much to be regretted that this curious piece of Norman wall has been so badly treated. About 90 yards of it remain, including eighteen arches. It stops at the Castle-lane, where was the main gate of the castle, removed at the end of the last century.

The wall, beyond the gate, was continued up the mound to the keep, and beyond it till it reached the southern gate, whence it was continued till it again struck the town-wall. Thus the keep was upon and formed part of the *enceinte*, as was usual. From the south gate, also removed in the last century, a winding road, commenced from the wall, led down to Simnell-street, a few yards within the postern.

Besides these two gates, the castle had a small water-gate in the wall towards the shore, reached probably by a flight of steps or a subterranean passage, as the outlet was so far below the platform of the castle. To the north of this gate is a large subterranean vault, now closed; and, judging from the openings in the wall, there was a corresponding vault to the south. Probably these were connected with the gate.

The whole area of the castle is high, and much of it has been still higher, the mound having been lowered, the ditch partially filled up, and the bank along which the wall was built having been removed.

To judge from the material evidence afforded by an inspection of the works, it would appear that the castle represents the Saxon or Danish earthwork, probably the earliest strong place, and was composed of a truncated mound, its circular ditch, and a bank of earth encircling an area, of which the mound or a moiety of it made part.

The Normans, probably in the reign of Henry I., enclosed the castle and town in a rectangular wall, and dug the east and north ditches. Also the castle was enclosed with a wall built in part on arches, and a shell keep placed on the flat summit of the mound. The wall of the castle, and much of the west wall of the town, and the two houses in Blue Anchor-lane, may be attributed to this period.

Then it became necessary to strengthen the town wall, and this was probably done in the reign of King John, who, it appears, remitted to the citizens 200*l.* out of their fee-farm rents for the enclosure of their town and the thickening of the wall, and perhaps the west and spur gates were begun at that time.

Much must have been done to the fortifications during the reign of Henry III. or Edward I. To this date are probably due the older drum towers and much of the wall connected with them, and the recessing of the Bar-gate and the addition of its flanking towers.

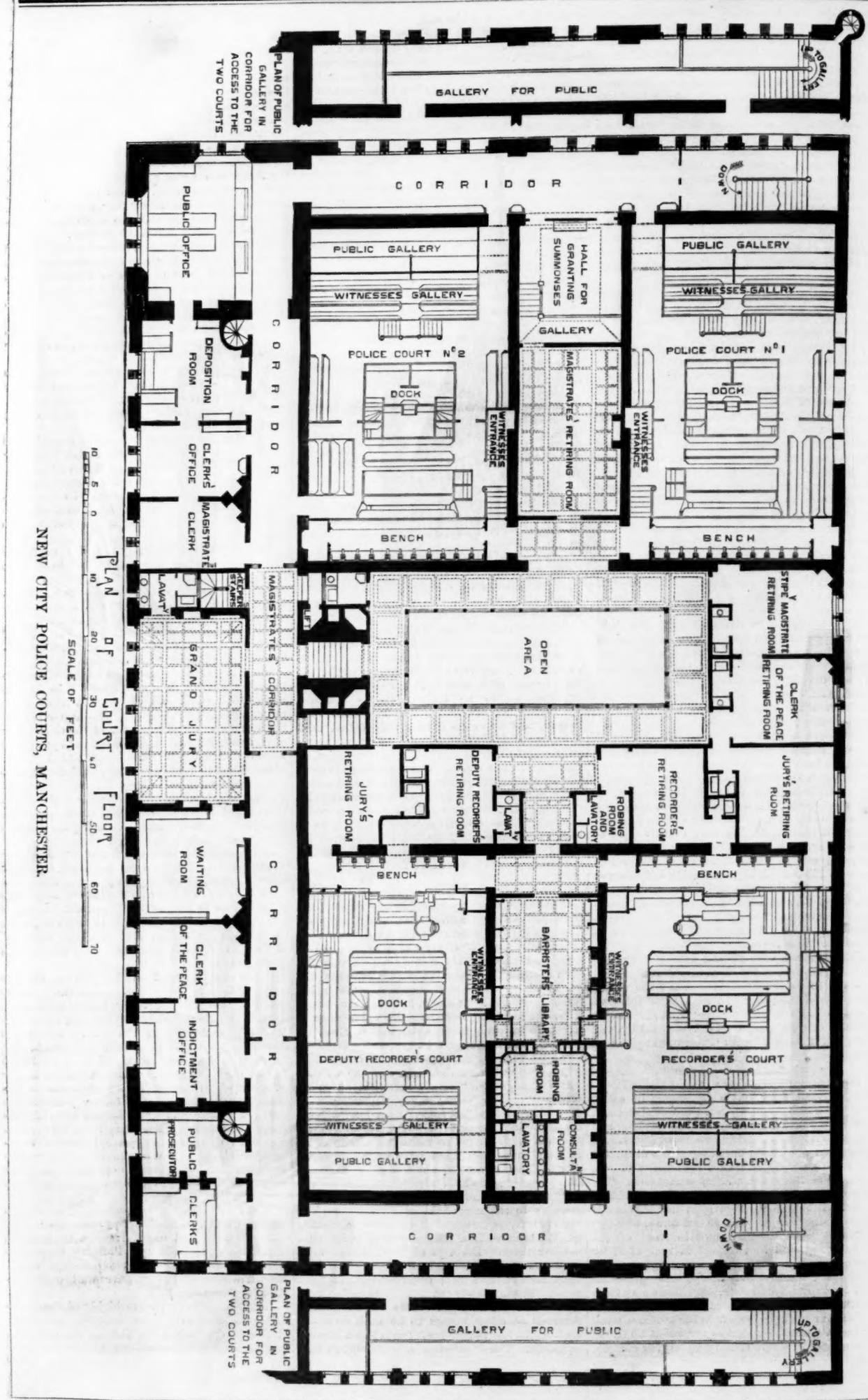
It appears that the town was attacked by pirates and sacked in October, 1338, 12 Edward III., and in consequence it was strengthened in the next year. The south and east gates may have been of this date, and the spur tower and its gallery, unless this latter be, with the completion of the Bar-gate, the work of Richard II. This king seems to have done much to the castle.

The vault indicated on the plan as on the north side of the water-gate is at present wholly under ground, being built against and within the exterior wall, its floor being about the level of the footing of the wall. The vault measures 55 ft. 3 in. north and south, by 19 ft. 6 in. east and west, and is about 25 ft. high. Sir H. Englefield says it has much the air of a chapel. Others call it a guard-room to the water-gate. A chapel would scarcely have stood north and south, and a guard-room, especially so large a one, however necessary for a main gate, would be quite out of place beside a mere postern. The vault was entered a few weeks ago through a long closed-up opening in the west wall, but the writer has been unable to learn what was then observed.

To the south of the water-gate is, or was, a similar vault, indicated by the openings in the wall, one 3 ft. and one 1 ft. from the ground, both long since built up. Probably these two were the substructures of two buildings which formed a part of the exterior wall, and were used for stores or cellars.

It is difficult to speak too highly of the large scale-plan of Southampton executed under Sir H. James, upon which the lines of the old wall, and position of other objects of antiquity, are shown in a manner which leaves nothing to be desired.

1872. G. T. C.


PLAN OF PUBLIC GALLERY IN CORRIDOR FOR ACCESS TO THE TWO COURTS
GALLERY FOR PUBLIC
UP TO GALLERY
CORRIDOR
PUBLIC OFFICE
DEPOSITION ROOM
CLERK'S OFFICE
MAGISTRATE CLERK
PUBLIC GALLERY
WITNESSES GALLERY
POLICE COURT N°2
DOCK
WITNESSES ENTRANCE
HALL FOR GRANTING SUMMONSES
GALLERY
MAGISTRATES' RETIRING ROOM
POLICE COURT N°1
BENCH
KEEPER'S STAIRS
LAVAT.
GRAND JURY
MAGISTRATES' CORRIDOR
OPEN AREA
STIPE MAGISTRATE RETIRING ROOM
CLERK OF THE PEACE RETIRING ROOM
JURY'S RETIRING ROOM
DEPUTY RECORDER'S RETIRING ROOM
ROBING ROOM AND LAVATORY
RECORDER'S RETIRING ROOM
WAITING ROOM
CLERK OF THE PEACE
INDICTMENT OFFICE
PUBLIC PROSECUTOR
CLERKS
BARRISTER'S LIBRARY
DEPUTY RECORDER'S COURT
RECORDER'S COURT
ROBING ROOM
CONSULTN ROOM
LAVATORY
SCALE OF FEET
PLAN OF Court Floor
NEW CITY POLICE COURTS, MANCHESTER.

MANCHESTER POLICE COURTS.—MR. THOMAS WORTHINGTON, ARCHITECT.

MANCHESTER NEW CITY COURT-HOUSE.

IN the early part of our present volume we gave descriptive particulars of the Manchester Court-house then in progress.* We now publish a view, and the plan of the principal floor. The building, which fronts Minshull-street, comprises accommodation for the daily police, for the City Quarter Sessions, and other magisterial business. We repeat a portion of the account already given. The style adopted, it will be seen, is that type of Gothic architecture of which examples abound in Florence, Verona, Sienna, and other cities of Northern Italy. At the angle of Minshull-street and Bloom-street is a lofty tower, the lower portion of which is occupied by offices, and the upper by the clock. The principal entrance into the building, for the use of magistrates and persons officially connected with the courts, is in the Minshull-street façade. From the entrance a broad flight of steps leads to a corridor parallel with Minshull-street, which is about 6 ft. above the footwalks, and gives access to barristers' dining-room, porters' room, and various other apartments on this floor. In the centre of the Bloom-street façade is the entrance to the public hall, connected with the police-courts, which is 84 ft. by 40 ft., and contains rooms for witnesses in waiting, separated by low glazed screens. A staircase from this hall admits the public to a corridor on the court-floor, which gives the witnesses and officers access to the two courts. From the corridor a short flight of steps leads to the balcony connecting the public portion of the two courts, and gives admittance to that portion which is reserved for spectators only, who are entirely separated from those having business to transact. Opposite to the entrance in Bloom-street a staircase from the public hall admits witnesses immediately wanted to a gallery which is raised 8 ft. above the hall floor. The remaining portion of the ground-floor is occupied by the rooms for prisoners awaiting trial, which are reached by double flights of stone steps from the cells below, and have each a separate stair leading to the docks. These waiting-rooms on the session side are separate from those on the police side by a large open area, 86 ft. long by 44 ft. wide, with entrance for the police-van to drive into for the purpose of discharging prisoners, and a large courtyard for the police.

The four courts, two of which are appropriated to the police business and two to the sessions, occupy the centre of the building, and are surrounded by the offices and corridors before mentioned, an arrangement by which the noise of the adjoining streets will be materially lessened. Each court is 53 ft. by 33 ft., and 36 ft. high, and is lighted by sixteen windows, and has a ceiling of pitch-pine, panelled and perforated for ventilation; the walls are also panelled to a certain height. The magistrates' stalls on the bench are covered by a canopy the full width of the court. In order to give increased facilities for the rapid despatch of business in the two police-courts, speaking-tubes and bells have been arranged to communicate from each of the magistrates' clerks' seats and the two docks to the general office. Similar provision has also been made for communicating with the officials in the basement. A corridor, 15 ft. wide, extending along the back of the building, and two shorter passages at right angles with the main corridor, give access to the cells, which are of various sizes. The windows in these corridors are large and numerous, glazed with obscured plate-glass. The warming and ventilation of the courts is a subject to which especial consideration has been given, and provision is made for passing heated air from the basement through a series of cavities or flues into the court-rooms and corridors. Air-ducts are arranged, so as to convey a supply of fresh air to the courts, and secure a constant change in the atmosphere. Heating-chambers and boiler-house are placed in the basement, and large channels are constructed under the former to convey fresh outer air thereto, which, after being purified and warmed, passes into the courts at the time in use.

The general contractors for the main building and the fittings of the courts have been Messrs. R. Neill & Sons; the ironwork was done by the Fairbairn Engineering Company; the heating and ventilating, by Messrs. Haden & Son; the carving, by Messrs. Earp & Hobbs; the gasfittings were by Messrs. Thomason & Co.; the stained glass by Messrs. Lavers, Barraud, & Westlake; the clock and bell, by Messrs. Cook & Sons, of York; the grates and chimney-pieces, by Messrs. Wilson & Co. Mr. Samuel Taylor acted as clerk of the works, and the whole of the works have been executed under the direction and superintendence of the architect, Mr. Thomas Worthington, of Manchester.

The works have been substantially carried out, and the cost of the building will be about 45,000*l.*

The fittings of the four courts, which are executed in pitch-pine, and necessarily of very intricate nature, together with furniture and fixtures of various kinds, will probably cost about 10,000*l.* additional. The principal part of the furniture is in black oak, substantial, and in accordance with the architecture of the building.

* See p. 162, *ante*.

FIREPROOF FLOORS.

IF the author of a letter on this subject in the *Builder*, p. 990, will heat a piece of old plaster floor, or of a plaster cast, in the fire, and then place it under a water-tap, he will have reason to change his opinion about the fire-resisting properties of manufactured gypsum.

The terms "roasting," "burning," and "calcining," are practically synonymous when applied to the conversion of minerals; and it is self-evident that unless the gypsum is subjected to the proper heat, it cannot be made into plaster floors. No person placing his bare feet on one of these on a winter's morning will dispute your correspondent's assertion that it is a non-conductor of heat, and its non-liability to ignition, makes it so far fire-preventive.

The "Dennett" arch is a clever adaptation of a cheap and useful material, and it is a pity the mistaken zeal of its advocates should tend to mislead, by crediting it with properties it does not possess. It will not resist a fire. Such an event would make the material red-hot, completely destroying its tenacity; and the effect of water poured upon it in that state would be to reduce it to "utter rottenness."

The best protection for iron in a building on fire would probably be an adaptation of the American scheme mentioned in a recent number of the *Builder*, by making the girders hollow, and keeping them and the columns constantly filled with water, with proper supply, expansion, and escape pipes. This would involve considerable expense in fitting, but there can scarcely be two opinions as to its effect in preserving the iron in its original shape and position.

Supposing this could be done, then brick arches and lime concrete spandrels would probably be found most suitable to resist the spread of fire. Y.

SCHOOLS OF SCIENCE AND OF ART.

Nottingham Mechanics' Institution Science Classes.—The annual distribution of prizes gained this year by the students at these classes has been made in the lecture-hall of the Mechanics' Institution, by Mr. T. Hawksley, president of the Society of Engineers. There was a large attendance of students and their friends. Mr. E. Gripper presided. The chairman, in opening the proceedings, said he was glad to tell them that these classes were rapidly increasing. Four or five years ago the number of classes was only four or five, whereas now it was sixteen, and he looked upon that as showing that the efforts of the committee to place the classes on the best possible footing had been appreciated by the town. Mr. Hawksley, in his address, said,—The inhabitants of Nottingham have been for long past, and are still chiefly, although not exclusively, occupied in the production of textile fabrics, limited, for the most part, to articles of lace and hosiery. But, although the production of these articles will, for many years to come, and, perhaps, always, constitute an important portion of the trade of Nottingham, yet, I feel assured, that the time is not far distant, nay, is fast approaching, when Nottingham, following in the bolder steps of Leeds and even in the feebler steps of Derby, will begin to turn its attention to the realisation of the no longer hidden treasures which a beneficent and an even prodigal nature has placed at its immediate and easy disposal. If my anticipations be correct, Nottingham will become in a few years hence a great centre of the coal and iron trades, and (her manufactures no longer confined to lace and hosiery) will emulate in wealth and enterprise the prosperous towns of Glasgow, Newcastle, Leeds, Sheffield, and Birmingham. I recognize in the scheme of tuition of the rising generation adopted by this Institution, much that is valuable as an educational training, and much that is well fitted, if properly directed, to help on the attainment of the important object to which I have asked your attention. Yet I am not without apprehension, lest our modern system of competitive examination should bring to the front all the clever lads full of "cram," and leave in unmerited obscurity the young men of greater abilities and sounder acquirements, but so far, unfortunately, of a more deliberate and less showy activity. Avoid cram, for cram is but scientific gossip, which goes in one ear only to go out at the other, and be lost for ever. With preliminary knowledge the student of the science classes connected with the Nottingham Mechanics' Institution will be well prepared to assist, with no common advantage to himself, in the developing and utilising of the natural resources of his country, in few places more abundantly displayed than in the circle of twenty miles radius which has Nottingham for its centre.

The Ryde School of Art.—The president's *conversazione* has been held at the town-hall. About 800 ladies and gentlemen attended. The walls were almost entirely covered with a collection of oil and water-colour paintings, crayon drawings etchings, pyrographs, photographs, &c. Mr. R. J. Jones read the report, which showed that the number of persons in the artizan class at present on the books was thirty-five. At the examination thirty-five out of fifty-seven candidates obtained certificates, eight passed in the third grade, and eight in the second; by no means a bad average. After the distribution of the prizes, the president, in allusion to the master of the school, Mr. J. C. Swallow, said that he had come to Ryde with the highest testimonials from South Kensington, and in January next, he was pleased to announce, Mr. Swallow would deliver a course of lectures on the progress of art, which he knew would be well worth attending.

The Projected Stafford School of Art.—The members of the committee have had several meetings and discussions, and Mr. Buckmaster has been addressing them, and other gentlemen at a meeting recently held. The address is being circulated in a printed form. The success of the experiment now depends entirely on the interest taken in it by the inhabitants.

The South Kensington School of Art.—The annual distribution of the prizes awarded to the students of this school took place in the Lecture Theatre at the South Kensington Museum, Lord Ronald Leveson-Gower, M.P., in the chair. His lordship was introduced by Mr. Cole. The prize winners were the students of the two schools at South Kensington—one for male and one for female students, the schools being in competition with each other, and with all those of the United Kingdom. The competitors did not, however, include all the students of the schools, those in training for future teacherships and the national scholars not being eligible to compete for the school prizes. The medals and books to be distributed represented only the higher grades of distinctions obtainable by students, the minor honours not being included. They consisted of two gold medals, nine silver medals, nine bronze medals, and eighteen Queen's prizes of books, all won in the national competition, besides forty prizes of books won in the local prize section. These included the whole of the prizes gained at the great annual competition.

Newcastle School of Science and Art.—The annual meeting of the friends and supporters of this institution has been held in the Guildhall, was largely attended. The walls of the room were adorned with the works of the students, which were numerous. The chair was taken by Mr. C. M. Campbell, who was supported on the platform by the Mayor of Newcastle and others. The hon. secretary read the reports. The committee said "They have much pleasure in stating that there is a decided increase in the attendance of students, as shown in the increased amount received for fees. They are encouraged not only by the satisfactory progress of the school, but also by the improved state of the income."

The Manchester School of Art.—At the annual distribution of prizes in connexion with this school, the Bishop of Manchester was present. His lordship said he had not had much opportunity of judging of the state of art in Manchester. He had, of course, the privilege of an *entrée* into many mansions, the walls of which were hung with magnificent productions of modern artists; but those, or most of them, were not the products of Manchester artists.

The main phenomenon in Manchester that presented itself to his mind was the beautifying of churches, and he must confess that, if Mr. Mückley could introduce a higher and a purer taste in this matter, he would have done something which he should rejoice to see.

EXPERIMENTS ON THE OXIDATION OF IRON.

Professor F. Crace Calvert, F.R.S., in the *Journal of the Society of Arts*, gives an account of some experiments, the results of which we may state in a condensed form:—Some two years since, Sir Charles Fox inquired of me if I could give him the exact composition of iron-rust, viz., the oxidation found on the surface of metallic iron. I replied, that it was admitted by chemists to be the hydrate of the sesquioxide of iron, containing a trace of ammonia; to this he answered that he had read several books on the subject, in which the statements referring to it differed, and, from recent observations he had made, he doubted the correctness of the acknowledged composition of rust. He further stated, that if he took a bar of rusted wrought iron, and put it into violent vibrations by applying at one end the fall of a hammer, scales would be separated, which did not appear to him to be the substance I had described.

This conversation induced me to commence a series of experiments.

The specimens gave the following results when submitted to analysis:—

	Conway Bridge.	Llangollen.
Sesquioxide of iron	92·900	93·094
Protoxide of iron	6·177	5·810
Carbonate of iron	0·617	0·605
Carbonate of lime	0·295	0·295
Silica	0·121	0·196
Ammonia	trace	trace
	100·000	100·000

These results clearly show the correctness of Sir Charles Fox's statements, that the composition of the rust of iron is far more complicated than it is stated in our text-books. Therefore, the question may be asked, is the oxidation of iron due to the direct action of the atmosphere, or to the decomposition of the aqueous vapour; or does the very small quantity of carbonic acid which it contains determine or intensify the oxidation of metallic iron? To reply to these queries I have made a long series of experiments, extending over two years, which I hope will tend to throw some light on this very important question; and, although it appeared to me an easy matter to solve, still I have had many difficulties to overcome.

The results prove that, under the conditions described, pure and dry oxygen does not determine the oxidation of iron; that moist oxygen has only a feeble action; dry or moist pure carbonic acid has no action; but that oxygen containing traces of carbonic acid acts most rapidly on iron, giving rise to protoxide of iron, then to carbonate of the same oxide, and lastly to a mixture of saline oxide and hydrate of sesquioxide.

As these facts tend to show that carbonic acid is the agent which determines the oxidation of iron, I am justified in assuming that it is the presence of carbonic acid in the atmosphere, and not its oxygen or aqueous vapour, which determines the oxidation of iron in common air. Although this statement may be objected to at first sight, on the ground of the small amount of carbonic acid gas existing in the atmosphere, still we must bear in mind that a piece of iron, when exposed to its influences, comes in contact with large quantities of carbonic acid during twenty-four hours.

These results appeared so interesting that I decided to institute several series of experiments.

One series, on the action of oxygen-carbonic acid on iron in presence of water, confirms the previous ones, that carbonic acid is a most active agent in determining the oxidation of iron.

Another, on the action of carbonic acid on iron in presence of water, further illustrates that carbonic acid is the real determining agent of the oxidation of iron.

Whilst I was engaged in the above experiments, it occurred to me that it might be useful to make a series with the view of throwing light, if possible, on a fact stated by Berzelius, and well known to alkali and soap manufacturers, viz., that caustic alkalies have the property, even when dilute, of preventing the oxidation of iron.

I was much surprised to find that the carbonates and bicarbonates of the alkalies acted in the same manner as their hydrates, in preventing the oxidation of iron, not only on that part of the blade immersed in the solutions, but also on that which was exposed to a damp atmosphere of common air. Previously to obtaining these results, I was inclined to believe that caustic alkalies prevented the oxidation of iron by absorbing the carbonic acid of the atmosphere; but, as carbonates, and even bicarbonates, act in a similar manner, it is evident that this view of the action was erroneous.

The series of experiments confirms the opinion that the iron exists in a passive condition, and that this condition only attains sufficient power to resist oxidation by atmospheric oxygen when there is 5 per cent. of either hydrate or carbonates of alkalies in solution.

I have made many experiments with the view of discovering the cause of the interesting preservative action which alkaline solutions exert on iron, but have failed. Knowing the destructive influence which sea-water has on iron, and the serious injury done on iron ships through the action of bilge-water, a series of experiments were made with sea-water, to which was added such a quantity of caustic soda, or potash, or their carbonates, that, after the salts of lime and magnesia were decomposed, there still remained in the solutions 1 to 5 per cent. of alkalies or the alkaline carbonates; and when iron blades were introduced into such liquids, they gave the same results as when iron had been dipped partially into an alkaline solution of Manchester water. I would propose, in conclusion, that a certain quantity of soda-ash should be introduced from time to time into the bilge-water of iron ships, as by so doing a great saving would be effected, as it would prevent the rapid destruction of such ships.

As iron ships are rapidly destroyed when used for conveying sugar from the colonies to this country, I instituted a series of experiments. Blades of iron were partly immersed in a solution containing 10 per cent. of sugar, and in similar solutions to which had been added 2½ to 5 per cent. of caustic and carbonate of soda; after a month the same results were obtained with the saccharine as with the aqueous solutions. A piece of zinc covering about a fifteenth part of the blade preserves the iron from rusting in that part of the blade immersed in the sugar solution. The use, therefore, of plates of zinc fixed on the sides of an iron vessel, or, perhaps better, the employment of galvanised iron plates in the construction of ships, deserves the attention of shipowners.

EXTRAORDINARY IMPROVEMENTS.

A bricklayer, John Hurren, was brought up on a warrant, at Hammersmith, charged with maliciously damaging premises during his tenancy.

Mr. James Gutteridge said the prisoner had occupied a house belonging to him in Peel-street, Kensington. The tiles had been taken off, and a hole made through it, letting in the water, and causing considerable damage. He found the staircase window taken out, the brickwork removed, and a door placed in the opening, leading to a considerable fall. The cistern had been shifted, and the wash-house wall pulled down and left open. He estimated the damage to the house at 8*l.*, besides 14*l.* for rent.

Mr. Ingham: All these alterations might be considered tenant's improvements? Did he send in a bill for them?

Witness: No, sir: he could not, as the place was not inhabitable: the prisoner said he intended the works for improvements. He termed the hole in the roof a "dormer." He took out the staircase window for an improvement, as he intended to put in a glass door. He altered the wash-house to live in it in the summer time.

Mr. Ingham said the alterations seemed to have been made to make the house a pleasant one for the summer. He did not see any reason for saying that the prisoner was out of his mind, only that he had that mania for changes which was to be found in other men. He ordered him to pay 8*l.* and 4*s.* costs, and in default of distress, to be imprisoned for one month.

LAW OF CONTRACTS.

The following extracts from the index to the *Law Journal Reports* may be usefully noted. The cases to which they relate have been already referred to in our pages, but the decisions are here put in a more precise manner:—

Builder and Architect: Rectification: Negligence; Extra Work: Arbitration: Undisclosed Agreement.—A builder made a tender undertaking to sign a contract to execute for a certain sum certain works described in some rough sketches and verbal explanations of an architect. The architect subsequently sent by special messenger to the builder a contract to perform for the sum named the works delineated and described in certain plans and specifications thereto annexed. These differed materially from the works described in the rough sketches and verbal explanations on which the builder had made his tender. The builder, however, signed the contract without any examination, and completed the works according to the plans annexed to it. He then filed a bill claiming to have an account taken of the works executed by him on the basis on which he had made his tender:—*Held*, that as the mistake under which he signed the contract was due to his own negligence, and he had not taken proceedings for rectifying the contract as soon as he discovered it, he was not entitled to any relief in this respect. (*Kimberley* v. *Dick.*)

A building contract contained the usual clause, appointing the architect arbitrator in respect of extra works; the architect had guaranteed to his employer that the total cost should not exceed a certain sum, but that fact had not been disclosed to the builder at the time he signed the contract:—*Held*, that the guarantie was a material fact tending to influence the architect's decision, and as it was not disclosed to the builder, he was not bound by the submission to the architect's arbitration, and the Court would perform the part of arbitrator in the matter. —41 L. J. (N. S.) C. 38.

Liability of Builder on Building Contract by Civil Code of Lower Canada.—By the Civil Code of Lower Canada, Article 1,688, it is provided that, "If a building perish in whole or part within ten years, from a defect in construction, or even from the unfavourable nature of the ground, the architect superintending the work and the builder are jointly and severally liable for the loss." The appellant, a builder, entered into an agreement with the respondent, the rector of the cathedral of Montreal, to build a new cathedral on foundations which had already been constructed by another builder. Shortly before the completion of the work the tower sank, and other damage occurred, owing to the insufficiency of the foundations:—*Held*, that inasmuch as the contract did not limit the appellant's liability to his own work, he was liable for the damage caused by the insufficiency of the foundations. (*Wardle* v. *Bethune.*)—41 L. J. (N. S.), P. C. 1.

ADULTERATION OF COALS.

Sir,—Although I quite admit that one should not feel the slightest astonishment at any phases of development in the most popular of all sciences in the present day,—to wit, adulteration,—I must candidly confess that I was not prepared to see the extent to which it could be carried in the matter of household coals. Mixtures of inferior qualities we have, of course, been long and systematically accustomed to. I am not going to complain of that, for I understand so much of the principles of political economy as to know quite well that the price of such a commodity is apt to vary inversely with its quality. Even if I did complain, I suppose it would turn out to be a work of supererogation, and I am too old a hand to commence carrying coals to Newcastle.

Here is what I do complain of, however, and I think it a most justifiable complaint. In the last cellarful of coals which I stored (or, rather, which were stowed for me with the utmost despatch and celerity), it turns out that they are *mixed with stones*, in the proportion of about a hundredweight to the ton. Surely this is too bad. I would not, perhaps, have been, even now reluctantly, driven into print, had the quarry selected by the coal-masters not consisted of a hard, laminated, and schistose rock, which, in place of silently crumbling into powder and dust by the action of heat, does nothing but sputter and splurt and spark out of the grate the whole evening, to the great annoyance of my temper and the damage of my carpet. Indeed, I was actually hit on the face, last night, by a red-hot splinter of stone, about the size of a Turkey-bean. For the sake of honesty, and truth, and fair dealing, pray let us have a sharp denunciation of such villanous malpractices in your respected columns.

A Householder.

FALL OF BUILDINGS.

Fall of a Factory in Birmingham.—A large factory at Balsall Heath, near Birmingham, belonging to Messrs. Davenport & Cole, jet ornament manufacturers, has fallen, leaving only the warehouse standing. The factory adjoined the river Rae, which overflowed its banks and undermined the foundations. Indications of weakness were observed some hours before, and the workpeople left the premises in time.

Fall of a large Wall at Mexbro'.—A large wall recently built by the Manchester, Sheffield, and Lincolnshire Railway Company, in connexion with a new road from the town of Mexbro' to the station, has fallen. The part which fell, owing to the ground giving way, was about 50 yards in length, and the damage is estimated at 800*l.*

Fall of a House in St. Miles's, Norwich.—The house had been uninhabited. Mr. Morant, the city surveyor, was quickly on the spot, and at once determined that the adjoining house, which was in a most critical condition, should also come down. For this purpose, two scaffolding-poles were used as battering-rams, and a rope was passed through the chamber windows. The house was struck at from the churchyard, and in a few minutes the ruinous old structure fell down. A gable belonging to the first house that fell, and which was left standing, was also demolished. The houses had previously been condemned by the surveyor as dangerous and uninhabitable.

Royal Academy.—Mr. Edward Armitage was on Monday night elected a Royal Academican in the place of Mr. H. R. Pickersgill, retired. Mr. J. Durham, A.R.A., was next to Mr. Armitage in the ballot. The election for associates will be held in January.

CHURCH-BUILDING NEWS.

Penninghame (Galloway, Scotland). — All Saints' Church, Penninghame, has been consecrated, in presence of a crowded and fashionable congregation. There was previously no Episcopal place of worship in the neighbourhood before Mr. and Mrs. Stopford Blair, of Penninghame, caused the one under notice to be erected,—the nearest for Newton Stewart being the chapels in Galloway House and at Cally, sixteen and eighteen miles distant respectively. The church consists of nave and chancel, wood porch on stone base, and gabled organ-chamber and sacristy. Three bells are hung in a wooden bell-cot at the eastern end of the nave. The edifice is simple in its design, which is Early Decorated of the thirteenth century. It is built of blue limestone, with white freestone dressings, and is lined throughout with Bath-stone ashlar. The east and west windows are three-light, with plate tracery; and the others are single lights, with trefoil heads. The seats are open, and all free. All the roof is wrought and moulded, and in the nave is exposed to view, being plastered between the rafters, the plastering to be tinted sky-blue, with gilt stars. The aisles, chancel, and sacrarium are laid with encaustic tiles, by Mr. M'Colla, of London. The chancel is raised above the nave, and is separated therefrom by a low wrought-iron screen, worked by Messrs. Hart & Peard, London; and the organ-chamber is enclosed by a moulded screen of wood. The cross, candlesticks, and vases for the altar were presented by Sir Thomas Dick Lauder, bart. The windows are filled with tinted cathedral-glass, the east window and three side windows being stained by Mr. G. Gibbs, of London. The three latter are "In Memoriam." The church measures 70 ft. by 22 ft., internally, and has been erected, with the exception of 500*l.* from Mrs. Blair, at the sole cost of Mr. and Mrs. Stopford Blair, of Penninghame House. The architects are Messrs. W. G. Habershon & Pite, of London; the clerk of the works, Mr. Park, Newton Stewart; and the builders respectively, Messrs. Murray, Girvan, and Annandale, of Edinburgh; whilst the pulpit, font, and wood-screens have been made by Messrs. Cox & Sons, London; the bells, by Mr. Mears, London; the organ, by Messrs. Telford, of Dublin.

Tortworth.—The small parish church at Tortworth, after undergoing considerable restoration, has been re-opened for public worship. In every possible case the materials employed in the old building have been replaced in the new. The building is, in fact, the same. The entire cost is estimated at about 5,000*l.*, and the whole of this sum is the gift of Earl Ducie. The work has been done under his lordship's direction, and under the superintendence of Messrs. Carpenter & Slater, of London, architects. The actual work has been managed by Mr. John Groves with regard to the carpentering; Mr. T. Hudson executed the mason's work; Messrs. Gay, of Bristol, were the glaziers; and Messrs. Clayton & Bell, of London, have supplied the stained glass. The ironwork of the church has been done by Messrs. Chew, of Stroud; the painting by Mr. J. Tillot, of Winterbourne; the plumbing by Mr. J. Isaac, of Wickwar; and the tiling by Minton, of London. The tower has been partially restored; it was pulled down to about 30 ft. from the top, and the pinnacles have been restored as they originally were. The body of the church has been entirely rebuilt. The walls are of sandstone and Box freestone. The seats in the church are for the most part of pitch pine. There has been an addition to the bells, which are now six. All have been re-hung, and there is a new treble bell, while the second has been re-cast. This portion of the work has been done by Messrs. Taylor, of Loughborough. The organ, on the south side of the chancel, was built by Mr. W. G. Vowles, of Bristol. The case was designed by the architects of the church restoration. The monuments that were in the former church have been replaced in the new.

Wotton Fitzpaine.—The ancient parish church of St. Paul, which has just been almost entirely rebuilt and generally restored, has been consecrated and re-opened for divine service. In 1871 it was proposed to re-roof and re-seat the church. An architect, Mr. G. H. Birch, from Messrs. Christian, Malford, & Co., was consulted, and condemned the whole building as ruinous and insecure. The chancel, nave, and south aisle have been taken down and rebuilt, and the north transept and vestry restored. It is built in the Early Decorated style of architecture, and consists of nave, chancel, south aisle, north transept, vestry, and tower. It will accommodate 200 people. The windows are all plain, except two, —the east, and one in the south aisle. The east has borderings of stained glass around the lights, and in the head are the Royal arms the arms of the diocese, and those of the Drewe family. The other window in the east end of the south aisle has been erected by Mrs. Luttrell to the memory of her brother, Mr. Rose Drewe, and of her son, Mr. R. F. Luttrell. It contains, in three lights, the Virgin and Child in the centre, with the Shepherds and Magi on either side. Above the altar is a reredos in mosaic, consisting of three panels, the central one containing a white jewelled cross on a gold ground, and in each side panel is an angel bearing a scroll with the word "Alleluia" inscribed on it. The chancel stalls are of oak, with their ends carved. The nave, south aisle, and north transept are seated with open benches, of stained deal. The roof is of stained deal, covered externally with slate. At all the gable ends of the building are carved crosses. There is at present only one bell in the tower. The whole expense of the restoration has been defrayed by Mrs. and Miss Luttrell, of Wotton House, and Mr. and Mrs. Bosanquet, with the exception of the new north transept and vestry, which will be, or have been, paid for by subscription. The reredos was presented by Mrs. Bosanquet, and the altar and altar-rails by Miss Luttrell. The architect was Mr. Birch; and the contractor Mr. W. Langford, of Lyme Regis, under whose superintendence the whole of the works have been carried out.

Sheepscombe.—The church here has been re-opened. The building had undergone various alterations and additions, under the superintendence of Mr. F. Niblett, of Gloucester, architect, Messrs. Wall & Hook, of Brimscombe, being the contractors. The length and width of the nave, which has not been extended, is 39 ft. 8 in. by 22 ft. 6 in. It had originally a flat ceiling, which has been removed, and the timbers of the roof are now shown—renovated, stained, and varnished. A large western gallery projected into this nave to the extent of some 13 ft. This, as well as the external steps leading to the same, has been removed. A kind of aisle, 14 ft. 6 in. by 12 ft., existed on the south side. All this has been removed, and the space thrown into the present south aisle, which has been extended westward 17 ft. The new chancel is 13 ft. 6 in. by 10 ft. 6 in.; and a new vestry has been built adjoining and open to the chancel by an archway. The east window has been filled with stained glass, by Constable, of Cambridge, erected to the memory of the late incumbent, the Rev. George Gibbon, M.A., the cost of which has been defrayed by subscriptions collected by his widow. The chancel floor is laid with encaustic tiles, in pattern, by Godwin. The new stalls are of oak and pitch pine mixed, of open work, carved, stained, and varnished. The whole of the interior has been re-pewed with open sittings. The church is also now warmed with stoves by Mr. Hill, of Stroud. The finish to the bell-turret should be improved.

Tollesbury (Essex).—Tollesbury Church has been reopened after having had a sum of about 2,000*l.* expended upon its restoration. The works include the rebuilding (last year) of the chancel, in stone, at the cost of the lay rector, Mr. E R. Benyon; the removal of an old gallery at the west end; the opening of the tower into the church; the removal of the old box pews, and the substitution of benches of a modern pattern; a new chancel arch, moulded; new open-timbered roofs, and a general strengthening of the walls in various parts. The works have been under the care of Messrs. E. Habershon & Brock, of London, architects; and, so far as they concern the tower and nave, have been executed by Mr. H. Runnacles, of Halsted, at a cost of about 600*l.*

Halifax.—An influential meeting has been held in St. Augustine's Schools to consider the practicability of commencing the building of the church of St. Augustine, which has been long in contemplation. Col. Akroyd presided. The following resolutions were unanimously passed: — "That it is desirable that St. Augustine's Church should be commenced in the early spring; that the architect be instructed to draw out working and detail drawings and specifications, with a view to letting the tenders; that the gentlemen present form the building committee, with power to add to their number." We understand that a sum of 3,427*l.* has been already promised towards the church.

Levenshulme.—The Church of St. Peter, Levenshulme, which consists of nave, aisles, and very short chancel, has been altered and decorated from designs supplied by, and under the superintendence of, Messrs. Maycock & Bell, architects, Manchester. A new reredos has been fixed, having moulded arcading in Caen stone, with alabaster shafts and panels. There are new choir-stalls, together with reading-desk and pulpit, in pitch pine, having arcaded fronts, with walnut-wood shafts. Hood-moulds have been placed round the nave arches and east and west windows, springing from heads modelled by Messrs. Williams & Millson, who also executed the reredos. The roofs throughout have been cleaned down and varnished. The decorations have been carried out by Mr. J. Owen, of Bowdon. Messrs. Sidebotham & Co., of Blackfriars-street, have executed the pulpit, choir-stalls, and other joiner work.

Hadfield.—The foundation-stone of a new church for the district of Hadfield, in the parish of Glossop, has been laid. The new edifice, which is dedicated to St. Andrew, is estimated to cost 2,500*l.* The church, which will be erected on a site purchased from Lord Howard, of Glossop, will be built of stone, ornamented with a spirelet 60 ft. high, and accommodate 500 persons.

Kirby Knowle.—The present owner is making very extensive alterations on "New Buildings" of Kirby Knowle castle, from the plans of Mr. G. F. Jones, of York, architect, under the supervision of his clerk of works, Mr. G. Harrison, of York. In connexion with this restoration, and by the same contractors, viz., Mr. Palliser, Northallerton, mason and brickwork; Mr. W. Bellerby, York, joiner and carpenter; Mr. Varvil, York, plumber; and Councillor Rawling, York, plasterer,—there is also the restoration or rebuilding of the church at Kirby Knowle, and which is of very ancient date. The foundation-stone was laid recently, by the present owner of the estate, Mr. Charles Elsley. In commemoration of the roof of the first new wing, and the laying of the foundation-stone of the new church, the owner gave the contractors and workmen connected with the two works an excellent dinner, at which upwards of forty sat down.

Hull.—At a meeting of the Burial Committee of the Local Board of Health, the surveyor (Mr. J. Fox Sharp), agreeably to the committee's resolution of the 9th of August last, submitted a plan for draining and laying out the new Hedon-road Cemetery, together with an estimate of the cost, and of the two chapels, entrance lodge, shed, and other requisite buildings, and of palisading and fencing the same, amounting together, including the cost of the land, to 18,000*l.*; and the same having been examined, it was resolved that the plan be approved, and that the surveyor advertise for carrying out the same.

New Hincksey.—The suburb of New Hincksey, which has become a populous neighbourhood, has now a church and schools. During 1870 a building was erected from designs prepared by Mr. E. G. Bruton, architect, Oxford, to serve the purposes of a school-room as well as a place of worship, and which continued to be used as such until last October twelvemonth, when proper school premises were completed, and formally opened. The chancel of the church was the only part that had been consecrated, and as the nave was no longer required for secular purposes, the earliest opportunity was sought to invite the bishop of the diocese to consecrate it, which ceremony has now been performed.

Newcastle-under-Lyne.—At a meeting of St. Giles's Church Rebuilding Company, it has been unanimously resolved "that the plan and perspective drawing of the proposed addition to and restoration of the parish church of Newcastle-under-Lyne by Sir George Gilbert Scott, now before the committee, be accepted and adopted and this committee pledges itself to use every effort to carry the execution of them to a successful issue."

Wolverhampton.—At a meeting of the committee for the interior restoration of St. Peter's Church, it has been resolved "that an appeal be made to carry out Mr. Christian's plans, and that while the open seats are being constructed temporary ones be used to prevent the church being closed." In reseating the church, the old woodwork will be used as far as possible, and no material change will take place in the present form of arrangement. The new seats will be like those at St. John's Church. The total cost will be from 1,000*l.* to 1,200*l.*, and the estimate of Messrs. Higham has been accepted for the work.

SCHOOL-BUILDING NEWS.

Wargrave.—The new buildings erected at the Wargrave district schools have been opened. The schools are for the accommodation of the children sent from the Reading and Wokingham Union, and for some time have been out of repair, and have been reported by the Government inspectors as unequal to the requirements of the children. The managers (under the advice of their architect, Mr. Charles Smith, of Reading), have remodelled the whole of the buildings, and taken down two of the wings which were very low and in a dilapidated state, and built two wings, one containing the schools and class-room, and the other the superintendent's apartments, stores, the Board-room, &c., the whole forming a complete set of school buildings, and equal in cubical space to the Government requirements for 180 children, both as to schools and dormitories. The accommodation is as follows:—Boys' and girls' schools, each 43 ft. by 18 ft. and 12 ft. in height; class-room, 18 ft. by 15 ft., pay-rooms, dining-hall, bath-rooms, &c. The dormitories, which are in all 260 ft. in length, are so arranged that the master and governess have respectively oversight of the children. New farm buildings are also in course of erection on the land in connexion with the schools, the labour on the farm being principally done by the children. The building works have been carried out by Mr. Woodbridge, of Maidenhead.

Colchester.—St. John's district school, Colchester, has been opened. The building is close to the church, on a site given by the Countess Cowper. The new school is of red brick, with Bath stone windows, oak blocks, and open-timbered roof. In addition to the school-room, there is also a class-room and gallery, and it is fitted up with desks, &c., in the customary manner. The cost of the building, which was designed and executed by Mr. J. Grimes, builder, Colchester, is estimated at 350*l.* or 400*l.*, and very nearly the whole, if not the whole, sum has already been raised. The school will accommodate ninety children, and it is to be hoped that it will be well attended.

Loughborough.—The memorial stones of the new schools in connexion with the Wesleyan Methodist body have been laid. The site of the new schools is in Leicester-road. The architect is Mr. Hodson. The Leicester-road front is designed in the Gothic style of the Decorated period, and is to be built of Mountsorrel granite, with quoins, string-courses, &c., of Bath stone. The central feature of the elevation is a porch with gabled doorway, giving access to the main building. On either side is a large lance window of Bath stone, with red Mansfield stone columns and carved capitals. Access to the schoolrooms and offices is also gained through a side entrance porch, the uniformity being retained by a class-room on the south side. The plan provides for a main schoolroom, 50 ft. by 30 ft., an infant schoolroom, two class-rooms, and in the basement a large kitchen and storeroom. Internally the building will be 17 ft. high to the top of the wall plate, the roof being carried on hammer-beam principals, ceiled at the collar, the enclosed space being used for ventilation. Provision is made for the heating and ventilation of the building by hot air. The erection will cost nearly 1,000*l.*

Brentwood.—The memorial-stone of new Congregational Sunday schools has been laid at Brentwood. The schools are to cost 800*l.* The schools are so far completed as to admit of the principal beams being raised for the roof. They are built of stock bricks, with red brick courses and mouldings, a free adaptation of the Geometric style of Gothic being adopted. The roof will be surmounted by a bell-turret. The principal room is about 30 ft. by 50 ft., and will accommodate about 300 children. An infant school, in which ninety children can be taught, is attached.

St. Austell.—The new schools erected by the St. Austell School Board at Mount Charles have been opened. These are the first schools built and opened in the Western Counties by a school board under provisions of the Elementary Education Act, 1870. The old British school-room will be still used as the infant school-room. The new rooms were erected, from the designs of Mr. S. Trevail, of Par Station, by Messrs. John Paul (carpenter) and Henry Ede (mason). The new buildings, separate rooms for boys and girls, a class-room being attached to each room, will accommodate 375 children, and have been erected at a total cost, including desks, forms, cupboards, &c., of 945*l.* Over the boys' entrance is a tablet in Ransome's patent stone, bearing the inscription, "The site of these schools was presented as a free gift by the family of the Veales to the parish of St. Austell."

STAINED GLASS.

Eye Church.—A window has been placed in the south transept of this church. It was painted and presented by Lady Caroline Kerrison. The subject is, "Christ blessing little children."

Petworth Church.—A stained-glass window has been placed in the chancel of this church by Mr. H. G. Brydone, in memory of his late wife and children. It is a double window, and represents the parable of the good Samaritan. The top of the window is a representation of our Saviour in the act of delivering his injunction,—"Go thou and do likewise." Messrs. Clayton & Bell, of Regent-street, executed the stained glass.

FROM SCOTLAND.

Rutherglen.—A new R.P. church has been opened for divine service, by the congregation which assembled for nearly three years in the new town-hall. The church is designed in the Early English style of architecture. The front elevation presents a large gable, in which there is a four-light window filled with tracery; the entrance-door is in the centre, with deeply-moulded jambs and shafts, with bases and capitals supporting the arch, which is also moulded. There is a tower and spire at the south-west angle of the building, rising to the height of 128 ft. Internally the church is divided into nave and aisles by columns with carved capitals supporting moulded arches. The timber trusses of the roof are exposed, and varnished. Light to the interior is derived from the large front windows, four windows on each side-wall, and a rose window (12 ft. in diameter) in the back wall over the pulpit, and filled with tracery and painted glass. The tracery of the large front windows is also filled with painted glass, and all other windows throughout the building have coloured border panes. The pews are of open framework, with stall-ends, and the entire timber-work of the church is stained and varnished. Sittings are provided for 750 persons. The architects were Messrs. G. P. Kennedy and R. Dalglish, Glasgow. The contractors were:—for the mason work, Messrs. Thomson & Martin; wright work, James Connell; slater work, Wm. Meikle; plumber work, A. & J. Tuff; plaster work, James Jordan; glazier work, G. & J. Rae; smith work, D. Sommerville & Co.; heating apparatus, James Combe & Son; gas fittings, Kenny & Brown; upholsterer work, Joseph Gow; bell-founders, Wilson & Christie, all of Glasgow; and the decorations were executed by Mr. Andrew Clark, of Rutherglen.

Galashiels.—A new suburb, with a population of about 500 people, has lately been built along the Edinburgh-road, and on the foot of Buckholm-hill. It is beyond the burgh boundaries, and consequently the local authority of Galashiels has no control over its sanitary condition. In Halleyburton-place, the houses are mostly new, and have been occupied as soon as the plaster was on the walls. There is neither lighting nor cleaning, no foot pavement, and no Macadamised roadway, and the nightsoil and ashes are laid out on the small garden plots at the back. The drainage is bad, and the water worse, and as a consequence fever generally prevails, and has resulted fatally in a number of cases. The Galashiels local authority has called the attention of the local authority at Melrose to the circumstances. In one block of eight houses the families are supplied with water from a well about 3 ft. deep, into which a large quantity of filthy surface-water finds its way.

Stirling.—At a meeting of the Town Council it has been agreed that a small granite block be erected beside the Roman stone on the Gowan Hill, to receive a copy of the original inscription, and that an iron post be placed above to point out the locality of the stone. The following inscription can be traced:—"In excv. agit. leg. II." (*In excubis agitantes legionis secundæ*). At the same meeting Provost Christie intimated that Sir William Stirling Maxwell intended to present the three oak carved heads which he had in his possession to the Smith Institution, to be placed in the ceiling of the library of that Institution. The provost suggested, and it was agreed, that the eight heads which were at present in the Justiciary Court-room should be placed at the disposal of the Smith Institution Trustees, for the same purpose. These heads were carved in the reign of James V. [and first of England], and formerly decorated the ceiling of the Presence Chamber of the Palace within Stirling Castle. Several of the heads having fallen from the ceiling, they were all stripped off, and it was only by accident that some were rescued from destruction.

Arbroath.—A mission meeting-house in connexion with the Ladyloan Free Church, Arbroath, has been opened. The house has been erected in East Grimsby-street, from plans by Mr. Aitken-head, architect. It is in plain Gothic, and consists of a hall and vestry. There is a recess or apse at the east end. The hall is seated for 275 persons. The cost of the building, including the price of the ground, is between 500*l.* and 600*l.*

Forfar.—Plans of the new county buildings for Forfarshire have been prepared by Mr. Wardrop, Edinburgh, and approved of by the Forfar County Commissioners, by whom the committee were empowered to obtain further subscriptions and confer with the subscribers on the works. The convener of the committee is Lord Dalhousie, who subscribed 1,000*l.* towards the buildings. It is proposed to erect them in connexion with the new Sheriff Court-houses at Forfar, and the plans embrace a county hall, 65 ft. by 35 ft., with committee-room adjoining, 26 ft. by 21 ft.; entrance-hall, cloak and retiring rooms, with all necessary conveniences; and rooms which may be turned into account either for a keeper's house or for chambers for the clerk of supply. The estimated cost, exclusive of architect's fee, which will be little if at all over 200*l.*, and the cost of the site and furnishing, are estimated not to exceed 4,000*l.* To provide a strong room for the records, some slight modification of the plans will be necessary. The sum already subscribed for the buildings amounts to 3,386*l.* 5*s.*

Aberdeen.—The Harbour Commissioners of Aberdeen have made their annual inspection of the New South Breakwater, and other works at the harbour. Nearly 2,000 ft. of the entire length of the breakwater have been finished. The construction will be suspended as usual during the winter.

VARIORUM.

Amongst the Christmas books comes to us "William with the Ring," a rhymed romance from the graceful pen of Mr. J. R. Planché.* The principal incidents in it formed originally the plot of an opera book written by the author for Mendelssohn, but which, from circumstances, was not set by him. It is a deeply-interesting story, admirably told, with the *fault*, according to some critics, of being thoroughly lucid and understandable from first to last, and suggesting Scott rather than Browning. We can honestly praise it warmly.——"Manual of Mythology" (Asher & Co.), by Alexander S. Murray; and "Nænia Cornubiæ," illustrative of the Sepulchres of Cornwall, by W. C. Borlase, F.S.A. (Longmans & Co.), will have proper notice in due time.——The capital little story, "Marion Lee's Good Work," by the author of "A Trap to Catch a Sunbeam," showing how a powerless child built a church, and which we praised warmly when it first appeared in a periodical, has been issued in a separate form for a few pence (Cassell & Co.), and ought to have a very wide popularity.——The neat little almanack issued by the Art Union of London will be found to contain information on art matters not elsewhere collected in one publication.——Messrs. De la Rue & Co. publish, as usual, various sorts and sizes of pocket-books and diaries, all distinguished by excellence of workmanship and completeness of finish.——We take a paragraph from the first number of Mr. Thornbury's "Old and New London," just published, concerning a "House with a Story:"—

"No house in Fleet-street has a more curious pedigree than that gilt and painted shop opposite Chancery-lane (No. 17, south side), falsely called 'the palace of Henry VIII. and Cardinal Wolsey.' It was originally the office of the Duchy of Cornwall, in the reign of James I. It is just possible that it was the house originally built by Sir Amyas Paulet, at Wolsey's command, in resentment for Sir Amyas having set Wolsey, when a mere parish priest, in the stocks for a brawl. Wolsey, at the time of the ignominious punishment, was schoolmaster to the children of the Marquis of Dorset. Paulet

* Tinsley, Catherine-street, Strand. 1873.

was confined to this house for five or six years, to appease the proud cardinal, who lived in Chancery-lane. Sir Amyas rebuilt his prison, covering the front with badges of the cardinal. It was afterwards 'Nando's,' a famous coffee-house, where Thurlow picked up his great brief. One night Thurlow, arguing here keenly about the celebrated Douglas case, was heard by some lawyers with delight, and the next day, to his astonishment, was appointed junior counsel. This cause won him a silk gown, and so his fortune was made by that one lucky night at 'Nando's'. No. 17 was afterwards the place where Mrs. Salmon (the Madame Tussaud of early times) exhibited her waxwork kings and queens. There was a figure on crutches at the door; and Old Mother Shipton, the witch, kicked the astonished visitor as he left."

——Cassell's "Household Guide" gives a few hints on carpets:—

"Stair carpets should be in length a yard longer than is needful for each flight of stairs, so that when they are taken up for shaking (not beating), they may not be put down again in the same creases, and thus at a trifling expense the carpets will wear as long again as by the usual method of exact measurement. The length required is ascertained by allowing half a yard for each stair, and adding to this the length needed for their landings. Brass stair-rods of the ordinary kind are not expensive, and the stair-eyes are purchased by the dozen. Parlours with folding-doors are the most convenient for a small house, as the doors may be closed at pleasure; but both rooms should be similarly furnished, as far as the carpet, chairs, and curtains are concerned. The patent 'felt' carpet is to be had in suitable tints; it is not expensive, and is easily made, and, when good, will wear tolerably well. There are many advantages in a felt carpet; not among the least is, that when it is worn out in the centre, the sides which are good can be cut off, bound, and arranged for bedside carpets; and that which is very much worn serves, instead of buying house-flannel, for cleaning door-steps, kitchen-hearths, and other rough work."

——The *Lithographer* says, as to staining and spotting of paper:—"Ink-stains, from common writing-ink, can best be removed by the use of chlorine-water,—a solution of chlorine-gas in pure water. The engraving should be wholly immersed in a very dilute solution, and, as soon as the marks disappear, be freely washed in pure water. Vegetable stains of most kinds will also yield to this treatment. As chlorine-water cannot always be obtained, we may use, especially for mere local spots, a dilute solution of the hypochlorites of soda or potassa, the so-called Labarraque's fluid, or *eau de javelle*, or, in default of either (but less suitable), a solution of ordinary bleaching-salts, hypochlorite of lime. In all these cases, there must be free washing with pure water. Grease-spots may be removed by the various kinds of hydro-carbon known as benzine, or in worse cases sulphide of carbon may be used. In such instances, great care must be taken, for these solvents not only remove extraneous grease, but they attack the oil of the printing-ink, and if they act too long or too powerfully they set loose the whole of the material of the ink, and the print or engraving will be destroyed."

——"The Metropolis Management Acts: Board of Works for the Westminster District. The Sixteenth Annual Report of the Proceedings of the Board, 1871-72. Mitchim, Parliament-street."—This report has been issued in a printed form. Amongst other points of interest, the reporters record an outline of the costly litigation with Lord Auckland, in which the Board were worsted as regards the line of frontage in York-place. Allusion is also made to the case as to the line of frontage at the corner of Bridge-street, in which the certificate of the superintending architect of the Metropolitan Board of Works was quashed by order of the Court of Queen's Bench. The attempt is also referred to of the Board to obtain the consent of Government to the demolition of the houses in front of the Government offices between Charles-street and Downing-street, but which were required for temporary offices till the new offices were completed.

Miscellanea.

Destruction of Wick Breakwater.—The effect of the waves in a gale on the new breakwater has been seriously to damage the works, which were executed on a new principle, with huge blocks of concrete. One of these, weighing, it is asserted, about a thousand tons, was laid down at the seaward end of the building, and so constructed as to give hope of resisting the most severe storms of winter. These hopes, however, have proved to be delusive, for this ponderous block was hurled from its place, leaving exposed to the fury of the storm the masonry on its landward side, which continued to be swept away as each successive wave dashed against and over the breakwater. Strong iron bars, measuring about 8 in. by 3 in., by which the masonry was secured, were twisted into all shapes, and broken.

A Ferry Steamer.—Illustrations are given in the current *Engineer*, of a steam ferry, for the conveyance of railway trains across the Little Belt, which has been recently built for the Danish Government railways by Messrs. Wigham Richardson & Company, of Newcastle-on-Tyne. The Danish Government have long had this service in contemplation, being desirous of making all the traffic of Scandinavia converge upon their country as well as the mail service from Finland. The ferry was to be so constructed as to cross the Little Belt in all weathers and at all seasons of the year. Usually the surface of the water is very calm, but occasionally in north-easterly storms there is a heavy sea running. Further, it was stipulated that the steamer was to be capable of taking on board 100 first and second-class passengers, 300 third-class passengers, and at the same time six of the largest trucks possessed by the railway administration, all fully loaded. The connecting bridges were also to be capable of supporting the heaviest locomotive engine and tender. Messrs. Wigham Richardson & Company have well carried out these conditions. The steamer is 140 ft. long, 26 ft. beam, and draws 7 ft. of water when loaded. It has been working uninterruptedly now for many months without any hitch. The last report from the engineer was as follows:—"I may state that the ferry and the whole arrangements are a most perfect success, and have been greatly admired by the French, German, and Russian engineers who have been sent by their respective Governments on purpose to see the arrangements."

The Master Builders and the London Carpenters.—It will be recollected that one of the clauses in the agreement signed between the Master Builders' Association and the carpenters and joiners in October last, expressed that 8½d. per hour should be the standard rate of wages for skilled men in London. A case came before the judge in the Southwark County Court last Saturday, in which a joiner, named Jepps, sued a master builder of the name of Jocelyn for 1s. 7d., being the balance between 8d. and 8½d. per hour for 39 hours' work. The defendant pleaded that he had several men working for him at ½d. per hour less than the standard rate of wages, and further declared he was not bound by the agreement with respect to the advance in wages, as he was no party to it. The judge said no master builder could plead ignorance of the agreement, and if he wished men to work for him for 8d. or 7d. per hour, he must make a special agreement to that effect. As there was no agreement of that nature with the plaintiff, he should give judgment for the amount claimed, with costs: in all, 7s. 1d.

Liability of a Workman for Damages owing to Carelessness.—At the Small Debt Court at Edinburgh, James Clark, house painter and decorator, sued John Monro, painter, for 1*l.* 15s., as loss and damage sustained by pursuer in consequence of defender, by wilful carelessness or fault, breaking a pane of plate-glass while painting the sashes. In support of the claim, pursuer explained that defender was ordered to paint the cupola of a saloon, but not the lead by which it was bound. He painted the sashes and the lead, and, when nailing down the lead, broke the glass. Defender said there was no woodwork to paint, and he had to lift the lead to paint underneath it in order to prevent the rain from coming in. The sheriff said the fact of defender's not saying anything about the matter at the time looked as if it had been done through his fault; therefore the presumption was against him. Decree for the full amount was passed.

The Temple Gardens.—The Metropolitan Board of Works have had under their consideration the question of removing the ugly fencing in front of the Temple Gardens, on the Embankment side, and replacing it with one of ornamental iron and stone. The design at first submitted by the engineer of the benchers was considered extravagant, but a second design, presented to the parks committee of the Board, was approved, tenders submitted, and that of Messrs. Gibbs & Co., for 7,000*l.*, was accepted.

Indian Views at the Society of Arts.—Captain Lyon has fulfilled his promise of showing, by means of the camera, another series of photographic transparencies illustrative of the Indian Temple architecture. Having on the former occasion seen the principal views of the South, the audience was this time conducted, *vid* Malta and Alexandria, to Madras and the North.

Fire at St. Andrew's Church, Southport.—This edifice, which was consecrated so recently as July 23rd, took fire, on a recent Sunday night, after the heating apparatus, of course, had been at work. Some two months ago, the hot-air apparatus by which the church is heated set fire to the joists, but on that occasion it was happily discovered in time to prevent the destruction of the church. Since that time the vicar, instead of using this apparatus, has heated the church morning and evening by means of gas. On Sunday the apparatus was brought into requisition, the consequence being the entire destruction of the south-east end of the church. The apparatus being placed immediately below the organ, which was opened a few weeks ago by Mr. Best, of Liverpool, that instrument has been entirely destroyed. The building and the organ, &c., are fully insured.

Professorship of Fine Arts, Cambridge.—The Professorship of Fine Arts, on the foundation of Mr. Felix Slade, is vacant, and the election of the new Professor will be held on Wednesday, the 29th of January, 1873. The Professor is required to give annually in the University, in full term, and free of charge as regards members of the University, a course of not less than twelve lectures on the History, Theory, and Practice of the Fine Arts, or of some section or sections of them. The Professorship is tenable for three years, and the Professor may be re-elected. The Professor will receive by way of stipend the dividends of a sum of 12,000*l.* Three per Cent. Consolidated Annuities. He is not required to reside at the University. Candidates are requested to send their names to the Vice-Chancellor on or before Friday, January 17th, 1873.

Bishopsgate Ward Schools.—The opening of the new schools, between Skinner-street and Primrose-street, in Bishopsgate Ward, took place in the presence of the Lord Mayor, who presided; Sir William Tite, M.P., Mr. Alderman Lawrence, M.P., Mr. Lyall (governor of the Bank of England), and many others. The school now completed will accommodate 800 children. There will be an upper school and a lower school for boys, an upper school and a lower school for girls, a school for infants, besides a place in which religious services and lectures will be conducted. In all the schools there will be space for 1,500 children. There is also to be a Board school in the adjoining district. It is hoped that the school will be self-supporting, when the debt of 1,250*l.* is wiped away.

Builders in Birmingham.—A meeting of the master builders has been held to take into consideration the notices received from the men asking for an alteration in the working rules. The men, in these notices, demand an extensive rise of wages, and the carpenters and joiners require a reduction of hours as well. These are the principal points, but there are details as to working hours, &c. At the meeting the master builders agreed upon a new set of rules, which they will issue as a counter notice. The representatives of both parties will meet to discuss the points at issue, and in the event of their being unable to agree, the dispute will be, it is hoped, referred to arbitration.

New Bank, Swindon.—The County of Gloucester Banking Company have just opened a new branch bank at New Swindon. The building, which is from designs by Mr. William H. Read, of Swindon, is in the modern Italian style. On the ground-floor there is a hall, bank-room, strong-room, lavatory, and back parlour. On this floor in the rear are also the usual offices of a residence. The floor above consists of drawing-room, four bedrooms, and lavatory. The interior of the bank is fitted with wainscot polished oak. The exterior of the building is ornamented with some carving, executed by Messrs. Chapman & Stillman, of Bath. The contractor for the erection of the building is Mr. G. Wiltshire, of Swindon.

Telegraphic Improvement.—Some experiments have been made by the postal telegraph staff to ascertain the possibility of sending simultaneously two messages in opposite directions on the same wire. Mr. W. H. Preece, engineer of the Post-office, has spent fifteen years in experiments and study to perfect the process. The trial is said to have been a success. Messages were transmitted at the same moment both ways between London and Penzance, a distance of 330 miles, with perfect distinctness, and at the ordinary speed. Mr. Scudamore and other officials were at the ends of the wire.

Restoration of the Church of St. Burian, at the Land's End.—This church has been unusually neglected, and is in a most deplorable state. An effort is now being made to collect funds for substantial repairs. The building has been examined by Mr. Butterfield. He reports that the church is in such a state that it must rapidly become a useless ruin, unless extensive repairs are made. It is in a peculiarly exposed situation, four miles from the Land's End, swept by winds from all quarters. At least 3,500*l.* are necessary to put the church in thorough repair. The *Cornish Telegraph* says that Mrs. Paynter offers 400*l.*; the Rev. John Tonkin, 200*l.*; Rev. T. B. Coulson, 200*l.*; &c.

Opening of a New Military Theatre at Chatham.—The new military theatre, which has been building for some time, and may be considered an offspring of the soldiers' institute, has been formally opened by Major-general Brownrigg, C.B., the commander of the district. The small building is erected out of the spare funds of the institution, and cost considerably under 1,000*l.* There are a pit, a dress circle, and a gallery, calculated together to hold between 600 and 700 people. The interior is very simple. The seats are comfortable and the ventilation is said to be good. There is a communication between the stage and the billiard-room, which makes the two buildings one.

Right of Way at Bromley.—A practical protest, in the form of a demolishment of 300 ft. of oak fencing, has been made at Bromley, in order to test a right of way which it has been attempted to close up. As remarked by the *Bromley Telegraph*, "this may have been an exhibition of brute force, but it possessed this advantage over legal proceedings—that it was prompt and reliable, and it threw the onus of proof upon the adjoining owner. Should that gentleman intend to punish those who tore his palings to atoms, he must first prove that his fence had a legal right in the position from which it has been removed."

Art Lectures.—In a recent lecture at the Taylor Institute, Oxford, Mr. Ruskin described his recent visit to the Gustave Doré Exhibition, which he called the abomination of desolation—a mass of devils, corruption, and death: no life, no motion, nothing but the vilest art, and the vilest conception. After a bitter philippic against Doré, his admirers, and imitators, he closed the lecture by reading an address to his pupils, in which he told them that humility was one of the first rudiments of art, and that they must understand not only the technicalities of the great masters, but must have in them the spirit of that religion which called forth all the masterpieces of Mediæval art.

American Journalism at the Vienna Universal Exhibition, 1873.—It is proposed in the United States that through and by the periodical Press of the country, the American system of common school education be thoroughly represented, both in its aim and its results. To that end, a single specimen number of *every* newspaper, magazine, or review issued in the United States, it is wished, should be exhibited; the collection also to embrace all *periodical* publications circulated gratuitously by tradesmen and others.

Combustion at the Gasworks, Marlow.—The overturning of one of the gasometers during the recent furious gale, occasioned much consternation in Marlow, as it caused the whole of the gaslights in the streets and private houses to be suddenly extinguished, and the gas on escaping from the gasometer became ignited and rose in a huge volume of flame high into the air. The gasometer contained nearly 5,000 ft. of gas, but fortunately the flames were exhausted before any of the surrounding property became ignited.

Election of a Borough Surveyor for Durham.—At a special meeting of the Durham Urban Sanitary Committee held lately, a successor to the late Mr. Collinson as borough surveyor was appointed. There had been originally 39 candidates for the office, and out of that number four had been selected. The choice of the committee ultimately fell on Mr. Brunton, of Sunderland, who had a large majority.

Art in the 1873 International Exhibition.—The Commissioners have resolved to include in each annual Exhibition of the Fine Arts a representation of the works of one or more artists who have died in the preceding ten years. In 1873, the works of Messrs. Phillip and Creswick will be exhibited.

Fall of a Mission Hall.—At Salford a disaster has occurred in which a considerable number of persons were much injured, and the lives of over 200 placed in jeopardy. A tea-meeting was being held in the Mission-hall, the floor of which gave way, precipitating the mass of people into a large coal-cellar beneath. Naturally the panic was extreme, and it was some time before the struggling men, women, and children could be extricated.

Industrial News.—It is announced that a new half-crown monthly magazine is about to appear under the title of the "Practical Magazine." It will be "an illustrated cyclopædia of industrial news, inventions, and improvements, collected from foreign and British sources, for the use of those concerned in raw materials, machinery, manufactures, building, and decoration." It is to be published for the proprietary at Printing House-square, next door to the *Times* office.

New Sewer at Weston-super-Mare.—The tenders for constructing a new sewer from Orchard-street to Claremont, Weston, were—Ritson, London, 5,440*l.*; Neave & Sons, Bristol, 4,391*l.* 18s.; J. Harvey & Son, Torquay, 4,250*l.*; Stradling & Son, Weston-super-Mare, 3,995*l.* 15s.; W. Merrywear, Bristol, 3,825*l.*; G. Taylor, Weston-super-Mare, 3,245*l.*; J. Hando, Weston-super-Mare, 3,150*l.* The last-named tender, being the lowest, was named for acceptance to the Board by the local Drainage Committee.

Boring the Wealden at Battle.—Mr. Henry Willett (hon. sec. and treasurer to the exploration fund) has issued his first quarterly report upon the sub-Wealden boring. The recent bad weather has, it appears, rendered the work unusually heavy and tedious: 96 ft. is the total depth reached. The diameter of the bore is proceeding at the stipulated minimum (9 in.). Mr. Willett intends to try to get the originally proposed diameter (6½ in. to 7 in.) adopted; otherwise, he says, 2,000*l.* will not do it.

Monument to the late Sir Thomas Winnington, Bart.—A plain monument has just been erected in the churchyard at Stanford, over the vault in which are deposited the remains of Sir Thomas Winnington, bart. The lower stage consists of three chamfered stone plinths, on the uppermost of which rests a coped tomb of Sicilian marble, bearing a floriated cross. The monument is from the *atelier* of Mr. Joseph Stephens, of Worcester, who has contributed to the Cathedral, to the Cemetery, and places of sepulture there and elsewhere, many works.

The Bristol Assistant City Surveyorship.—Mr. Pape, of Manchester, has been chosen by the Bristol Improvement Committee assistant to Mr. Josiah Thomas, the city surveyor, at a salary of 200*l.* a year. Mr. Pape held a similar office in Manchester. Mr. Munro, of the Ordnance Department in Bristol, received seven votes to Mr. Pape's eight.

A New Church in Paddington.—The foundation stone of a new church about to be erected in Paddington, has been laid by Lord George Hamilton, M.P. The intended new church is situated in Desborough-terrace, Harrow-road, in the immediate vicinity of Westbourne Park, where the large increase of the population has rendered a new church necessary.

Opening of a New Town-hall at Wirksworth.—A new town-hall has been opened at Wirksworth. The building was designed by Mr. Bradley, of Liverpool, the contract being let to Mr. Thompson, builder, Derby. The design is semi-Gothic, freely treated, and comprises large assembly-room, shop, reading-room, billiard-room, sundry offices, and a covered market-hall. The total cost is about 7,000*l.*

Raising a Building.—An American paper states that more room is needed in the Washington Post-office, and, as a proposition to put another story on the top of the edifice met with opposition, the architect has decided to raise the entire building 20 feet from the foundation, and make the required enlargement from the base.

Mortuary for St. Martin's-in-the-Fields.—The Vestry Committee appointed to consider this question, reported recommending that a mortuary be erected upon the burial-ground in Drury-lane, and the report has been adopted.

The Late Mr. Weightman.—The death of this architect, late of Sheffield, is announced It took place at South Collingham. Mr. Weightman was in the 71st year of his age.

TENDERS

For Weston-super-Mare drainage. Mr. William Gaskell, surveyor:—

Ritson	£5,440 0 0
Neave & Son	4,391 18 0
Harvey & Son	4,251 0 0
Straddling	3,995 15 0
Merewether	3,825 0 0
Taylor	3,245 0 0
Hands	3,150 0 0

For additions and alterations to premises, Broad-street, Ratcliffe, for Messrs. Hubbuck & Son. Mr. George Aitchison, architect. Quantities by Mr. D. Cubitt Nichols:—

Lucas, Brothers	£3,217 0 0
Cubitt & Co.	3,156 0 0
Outhwaite & Son (accepted)	3,123 0 0

For rebuilding the parish church, at Bruntingthorpe, Leicestershire. Mr. William Smith, architect:—

Loveday	£1,856 14 2
Osborne, Brothers	1,763 0 0
Law & Sons	1,734 8 6
Herbert	1,654 0 0
Bennett	1,582 0 0
Allen (accepted)	1,580 0 0

For rebuilding the nave and tower of Aston Flamville Church, Leicestershire. Mr. William Smith, architect:—

Law & Sons	£1,235 0 0

For the erection of stable buildings, at Kingswood Warren, Surrey. Mr. William Smith, architect:—

Rayment	£1,520 0 0
Brown	1,500 0 0
Manley & Rogers	1,464 0 0
Wagner	1,400 0 0
Potter & Ferrige (accepted)	1,346 0 0

For additions to brewery, Camden-town, for Messrs. Garrett. Mr. F. Peck, architect:—

Perry & Co.	£2,200 0 0
Manley & Rogers	2,177 0 0
Downs & Co.	2,116 0 0
Newman & Mann	1,876 0 0

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Asbestos.—This material, not being always obtainable, we depart from custom, and mention, in reply to "C. E.," that Mr. Swinburn, of 12, Southwark Bridge-road, has a stock on hand.

E. B. (Thanks. No).—Mr. K.—B. S.—Major L.—T.—C.—W. S.—G. W.—G. H. S.—J. S.—J. H.—A. H.—E.—J. C.—G. J. (he could do more than ask for compensation. He could stop the proceeding altogether).—J. K. (next week).—C. J. P.

We are compelled to decline pointing out books and giving addresses.

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TO ARCHITECTS IN PRACTICE OR MANAGING ASSISTANTS EITHER IN LONDON OR THE COUNTRY.
AN ARCHITECT, of extensive practice in London, who is declining in health, requires the immediate ASSISTANCE, with a view to ultimate Partnership, of a gentleman of energy, experience, and industrious proclivities, thoroughly qualified in every branch of his profession. References will be given and required. Names need not transpire until answers have been returned in the form submitted in the particulars.—For particulars, address A. Z. under cypher, to any address the applicant may state, care of Nissen & Parker, 43, Mark-lane, London.

TO BRICKMAKERS and OTHERS.—WANTED, a Gentleman with about 2,000*l.* as PARTNER (Sleeping or Active) in an established BRICKFIELD near Surbiton and Kingston-on-Thames. The brick-earth is of a superior quality, and the field is capable of turning out 9½ million bricks each season, for which there is a good local trade. Money wanted to pay off an advance and for working expenses, and to be under the sole control of finder.—Address, L. M. care of J. C. CANE, Esq. 15, Queen-square, Bloomsbury, W.C.

A FIRM of ARCHITECTS, SURVEYORS, and ESTATE AGENTS, in good practice, have a VACANCY for a PUPIL. Must be one who has been well educated and has a taste for drawing. A premium required.—Address, L. G. Post-office, Newport, Monmouthshire.

ENGINEERING PUPIL.—A Gentleman, C.E. in the North of England, is prepared to receive a PUPIL into his Office. Considerable professional advantages both as regards scientific training and practical experience, are offered.—Address, O. J. 22, Lendenhall-street, London, E.C.

BOROUGH of RYDE.—Notice is hereby given that the Corporation of Ryde require a fit person to execute the duties of BOROUGH SURVEYOR, under the Local and Sanitary Acts, within the borough of Ryde. The Officer to be appointed must possess a thorough and practical acquaintance with works of drainage, sewerage, waterworks, road-making, and paving, and he must be competent to superintend the execution of all works of the descriptions above referred to or which may fall within the duties of a Surveyor to a Local Board.
The Waterworks of the borough being vested in the Corporation, the Surveyor will be required to direct and superintend the management of the Works.
The Surveyor will be required to devote his whole time to the service of the Corporation, and he will be paid a salary of 150*l.* per annum. Any further information respecting the duties of the office may be obtained on application to the Town Clerk.
Candidates must send written applications for the Office, with testimonials as to qualifications and competency, and with particulars of ages and previous occupation; and all applications must be sent to me, endorsed "Application for Office of Surveyor, &c." on or before JANUARY 3rd, 1873. EDWIN HOPGOOD, Town Clerk.
Town-hall, Ryde, Dec. 20th, 1872.

PADDINGTON. — WANTED, in the Surveyor's Department, a THIRD ASSISTANT SURVEYOR. He must be thoroughly competent to superintend the formation and repair of roads and the paving of streets, to prepare estimates of paving works, to keep accounts in relation thereto, and to perform all other duties under the direction of the chief surveyor. Commencing salary, 140*l.* per annum, with an annual increase of 10*l.* until such salary shall reach 180*l.* which is to be the maximum. A list of duties and further particulars may be obtained at my Office, at the Vestry-hall, Harrow-road, between the hours of TEN and FOUR; SATURDAYS TEN and TWO.—Applications enclosing testimonials (not exceeding three in number) of recent date, to be delivered on or before FRIDAY, the 10th JANUARY next, at the Vestry-hall, Harrow-road, addressed to the "Vestry of the Parish of Paddington," and endorsed "Application for Appointment of Third Assistant Surveyor." Candidates will be expected to be in attendance on MONDAY MORNING, the 13th JANUARY, at TEN o'clock, but no travelling or other expenses will be allowed.—By order,
FRANK DETHRIDGE, Vestry Clerk.
Vestry-hall, Harrow-road, December 26, 1872.

TO ENGINEERS, SURVEYORS, AND OTHERS.
THE Town Council of the Borough of Dorchester desire to procure a competent Person to discharge the general duties of SURVEYOR to the Council. He will be required to reside within the borough, and superintend the management of the Corporate property, the waterworks, highways, and general works of drainage, and water supply, and to design, carry out, and record all such works on the General Plan of the Borough as necessity may arise. Applications (accompanied by testimonials) stating age, qualifications, and salary required, to be made in writing, and delivered at the Office of the Town Clerk, in Dorchester, on or before the 6th of JANUARY next.
Dated December 11th, 1872.

PARISH of CHELSEA.—INSPECTOR of REGISTERED LODGING-HOUSES and DUST INSPECTOR. Notice is hereby given that the Vestry of this parish will, at their meeting, on TUESDAY, the 31st inst. consider applications for the appointment of INSPECTOR of REGISTERED LODGING-HOUSES and DUST INSPECTOR. The salary, including travelling expenses, will be 62*l.* a year. The person appointed will be required to square and cube dimensions, to reside in a central part of the parish, and to devote the whole of his time to the duties of his office. A statement of the duties (subject to additions and variations from time to time), with other particulars, may be seen here. Applications, in the candidates' own handwriting, with testimonials of recent date as to character and fitness for the office, not more than three in number, may be sent in until TWELVE o'clock on the day above mentioned, and must be under cover, indorsed "Application for the Appointment of Inspector of Registered Lodging-houses and Dust Inspector." Personal attendance is necessary; applicants should, therefore, be here by THREE o'clock on the above-named day. The expenses of application will have to be defrayed by the applicants, as no travelling or other expenses will be allowed.—By order of the Vestry,
CHARLES LAHEE, Vestry Clerk.
Vestry Hall, King's-road, Chelsea, S.W. December 18, 1872.

MADELEY UNION.—The PUBLIC HEALTH ACT, 1872.—Notice is hereby given, that the Rural Sanitary Authority of this Union will (subject to the approval of the Local Government Board) at their Meeting, to be held in the Board-room in the Union Workhouse, Ironbridge, on FRIDAY, the 17th day of JANUARY, 1873, at ELEVEN o'clock in the morning, proceed to appoint an INSPECTOR of NUISANCES for the whole of the Union. The Inspector will be required to make a perfect sanitary survey of the whole district, including the sewerage systems and water-supply of all the towns and villages under the control of the Rural Sanitary Authority of the Madeley Union, and report generally on its condition and requirements, as well as to perform all the duties of Inspector, as prescribed by the Sanitary Acts and by the regulations of the Local Government Board. The number of inhabited houses in the Union at the census of 1871 was 6,189.
The appointment will, in the first instance, be made for six months, from the 17th January, 1873, at a salary of 4*l.* 4*s.* per week, such salary to include travelling and all other expenses.
Applications, with testimonials, to be sent to me on or before the 10th JANUARY next, and the Candidates selected will receive notice to attend on the day of election.
By order,
HENRY BOYCOTT, Clerk.
Ironbridge, December 17th, 1872.

FORDEN UNION.
RURAL SANITARY AUTHORITY.
An INSPECTOR of NUISANCES is required for the Rural District of the Forden Union, in the counties of Montgomery and Salop: comprising an area of about 79,800 acres, including the town of Montgomery (which may be converted into an urban district), and a population of 18,717. The salary will be at the rate of 200*l.* per annum, and the person appointed will be required to devote the whole of his time to the duties of his office, and to keep a horse at his own expense.
The duties will be—1. If required, to make a sanitary survey of the whole district, and to furnish a detailed report thereon to the Sanitary Authority; and (2), such other duties as are contained in the order of the Local Government Board, dated the 11th day of November last, or may be contained in such other orders or bye-laws as that Board may from time to time issue or sanction.
The appointment will be subject to the approval of the Local Government Board, and in the first instance be made for a term of twelve months.
Candidates are requested to send applications in writing to the Clerk, at his Office, at Montgomery, stating age, residence, past and present occupation, with recent testimonials as to qualifications and character, on or before SATURDAY, the 11th day of JANUARY next.
By order of the Sanitary Authority,
WM. WILDING, Clerk.
Montgomery, 18th December, 1872.

DRAUGHTSMAN (ARCHITECTURAL). WANTED, one accustomed to elevations and sections. Salary about 2*l.* 5*s.* per week.—Address, by letter, Mr. THORPE, care of Mr. Everett, 2, Bouverie-street, Fleet-street.

TO JUNIOR ASSISTANTS.
AN ARCHITECT requires the SERVICES of a JUNIOR ASSISTANT, who must write a good hand and be quick at tracing and copying drawings.—Apply by letter, stating terms and particulars of previous employment, to M. I, B. A. 3, Lancaster-place, Strand, W.C.

TO FIRST-CLASS DRAUGHTSMEN.
AN ARCHITECT has a VACANCY in his office for a first-rate DRAUGHTSMAN.—Apply, by letter, stating terms and particulars of recent engagements, to M.I.B.A. 3, Lancaster-place, Strand, W.C.

WANTED, a MANAGER, for STONEWARE PIPE WORK.—Applications to be addressed, U. 5,964, Mr. Frederic Algar, 8, Clement's-lane, Lombard-street, London, E.C.

WANTED, a good ARCHITECTURAL DRAUGHTSMAN, able to prepare working and detail drawings with precision from rough notes and sketches, and to draw readily and correctly in perspective. He must be practically acquainted with construction and competent, if required, to take out quantities, make estimates, and write specifications.—Apply by letter, stating age, upon what works, for what length of time, and with whom at present or previously engaged, and salary required, to B. Y. care of Marlborough & Co. 4, Ave Maria Lane, London, E.C. The situation is 50 miles from London, and of a permanent character, but permanency not guaranteed.

WANTED, in the Secretary's Office of an Iron Works in the North of England, a good and quick SHORTHAND WRITER, for general correspondence. A respectable and well-educated young Man of from 20 to 25 years of age is required. Address (in ordinary hand-writing), SHORTHAND, care of G. Street, No. 30, Cornhill, giving references, age, and salary required.

WANTED, a young Man, as CLERK, in a Builder's Office, to Assist in Estimating and Office Work.—Address, stating age, salary, hours, and last employment, J. S. care of Mr. Dodsworth, Cannon-street-road, St. George's, E.

WANTED, by a Firm in the Lamp and Chandelier Trade, a YOUNG MAN as ASSISTANT, about 20 years of age. Must be a good draughtsman.—Apply, by letter only, giving full particulars, to A. B. 72, New Bond-street, W.

TO BUILDERS' FOREMEN.
WANTED, a thorough FOREMAN, to carry out a large Job in the country. A carpenter by trade. Apply, by letter only, stating terms and references, and nature of jobs superintended, to B. N. & W. Mr. Hollock's Post-office, Gray's-inn-road.

TO CUTTERS AND FRET LEAD WORKERS.
WANTED, immediately, an experienced CUTTER and GLAZIER.—Apply, personally, 47, New Church-road, Camberwell-road, from 1st to 7th January, between Ten and Twelve a.m.; or by letter to Messrs. E. & S. BEER, 41, St. Bartholomew's-yard, Exeter.

WANTED, by a Surveyor, an expert JUNIOR ASSISTANT. State qualifications, career, age salary, references, &c.—Address, 392, Office of "The Builder."

YOUNG MAN WANTED, used to Painting, Graining, and Glazing; also Glass-cutting.—Apply at 66, Aldersgate-street, City.

YOUNG MAN WANTED as BOOK-KEEPER, used to the Lead and Glass Trade.—Apply by letter, stating age and salary and last occupation, to A. B. 66, Aldersgate-street, London.

WANTED, EMPLOYMENT, by a first-class GRAINER and WRITER.—Address, B. YOUNG, 186, Vauxhall Bridge-road, Pimlico.

TO ARCHITECTS AND SURVEYORS.
WANTED, a SITUATION, by a JUNIOR ASSISTANT. Good general and perspective draughtsman. Salary one guinea per week.—T. D. 31, Warner-street, Great Dover-street, S.E.

TO PLUMBERS AND DECORATORS.
WANTED, a SITUATION (by a tradesman's son), as MANAGER, or to Assist in the above. Can take charge of books, estimating, and general shop management.—Address, N. Post-office, Stoke-on-Trent.

WANTED, a SITUATION, as an OUT-DOOR or GENERAL FOREMAN. Has been employed in carrying out large public works, well adapted in the publichouse building and alterations. Ten years in last situation. Understands thoroughly the management of men. Used to heavy hoisting. Carpenter by trade. Good references if required.—Address, 190, Office of "The Builder."

WANTED, by an Architect's ASSISTANT, a RE-ENGAGEMENT. Thoroughly conversant with the preparation of working, detail, and perspective drawings.—Address, No. 199, Office of "The Builder."

TO ARCHITECTS AND SURVEYORS.
WANTED, by the Advertiser, an immediate ENGAGEMENT, as a JUNIOR. Four years' experience with London architects. Aged 21.—Address, X. 7, Ashburnham-road, Greenwich-road, Greenwich, S.E.

TO BUILDERS AND CONTRACTORS.
WANTED, by the Advertiser, aged 24, a SITUATION, as CLERK and GENERAL ASSISTANT to the above. Good references.—Address, A. Post-office, Stapleton-road, Bristol.

TO PLUMBERS AND BUILDERS.
WANTED, by an experienced young Man, a SITUATION as PLUMBER. Can do plain zinc work. Willing to make himself useful. Reference if required.—Address, J. G. Greatness Farm, Sevenoaks.

WANTED, by a thoroughly experienced MACHINIST, a SITUATION, to WORK a MOULDING MACHINE, GENERAL JOINER, &c. Can make cutters, and do own repairs if required.—Address, A. B. care of Mr. Puxshon, near Co-operative Store, Chester-le-Street, Durham.

TO BUILDERS AND HOUSE DECORATORS.
WANTED, by a young Man (married), aged 27, a SITUATION as FOREMAN, or as WRITER, GRAINER, and PAPERHANGER. Well up in each branch. Willing to fill up time in painting, &c. N.B. Well up in estimating.—Address, J. THOMPSON, 95, Aldenham-street, Seymour-street, Euston-square.

TO MACHINE JOINERY PROPRIETORS.
THE Advertiser, a young Man, is open to an ENGAGEMENT, either at home or abroad, to MANAGE a set of Wood-working Machinery. Has had fifteen years' experience, and is thoroughly acquainted with wood-working machinery generally. Address, 201, Office of "The Builder."

TO ARCHITECTS AND SURVEYORS.
PARTIAL or TEMPORARY ENGAGE-MENT required by the Advertiser, aged 31. Has carried out several works for himself, and could undertake the charge of an office. Terms moderate.—Address, B. C. J. 129, Kennington Park-road, S.E.

EVENING EMPLOYMENT required by a BUILDER'S CLERK. Aged 22. Disengaged after Six p.m. Neglected accounts, prime costs, &c. made up.—Address, A. C. Z. Post-office, 75, Aldersgate-street, London, E.C.

TO ARCHITECTS, BUILDERS, AND ESTATE AGENTS.
EVENING EMPLOYMENT WANTED. Drawings of every description, for buildings or alterations, accurately and expeditiously prepared, copied, or traced. Quantities prepared. Disengaged after Four p.m.—Address, A. B. 1, Boscobel-gardens, Alpha-road, N.W.

A DESIGNER and DRAUGHTSMAN requires a PERMANENCY, Mediæval, general ornament, heraldic painting, and other kinds of decorative designing.—Address, B. S. 11, Rathbone-place, W.

TO ARCHITECTS.
A FIRST-CLASS DRAUGHTSMAN, DESIGNER (Gothic or Classic), and COLOURIST. Well up in working drawings, details, perspective outlined or etched. Could enter into any engagement immediately.—Address, 196, Office of "The Builder."

TO ARCHITECTS, &c.
A FIRST-CLASS DRAUGHTSMAN and COLOURIST is now DISENGAGED. Experienced in competition, perspective, and design, and thoroughly conversant with the duties and practice of the profession.—Address, ARCHITECT, 34, Stanley-street, Eccleston-square, S.W.

AN ASSISTANT, of many years' experience, a first-class Designer in Classic or Gothic, and practical Man, is open to an ENGAGEMENT, in Town, temporary or otherwise. First-class perspective draughtsman and good colourist, and thoroughly experienced in competition work.—Address, L. X. care of Mr. Morris, Newsagent, Camberwell-green.

TO ARCHITECTS.
AN ASSISTANT desires a RE-ENGAGE-MENT. Aged 23. Salary moderate. Competition, working drawings, perspective, &c.—Address, A. B. Post-office, Bunbury, Tarporley, Cheshire.

A FIRST-CLASS ASSISTANT, thoroughly versed in Design, Detail and Working Drawings, &c. OFFERS his SERVICES.—Address, ARCHITECT, Delany's Library, 353, Fulham-road, S.W.

AN ENGINEER, with some years' experience on London and other Railways, wishes for an ENGAGEMENT. Well used to field or office work. Good references.—Address, M. E. Post-office, Millbank-street, Westminster.

A BUILDER'S SON WANTS a SITUA-TION, as FOREMAN, MANAGER, or CLERK of WORKS. Can prepare plans, estimate, measure up, thoroughly understands materials and management of men. Mason by trade. Total abstainer. Aged 25. References or security, if required. No objection to go abroad.—Address, 143, Office of "The Builder."